THE UNIVERSITY OF MAINE

Prof. Caitlin Howell
Chemical and Biomedical Engineering

Publications

Refereed Publications

1. Sotiri, I.; Tajik, A.; Ledoux, H.; Lai, Y.; Kovalenko, Y.; Nemr, C.; Alvarenga, J.; Timonen, J.V.I.; Hu.; Aizenberg, J.; Howell, C. Tunability of Infused Siloxane Polymers as Immobilized Liquid Layer Substrates. *Biointerphases, accepted*. DOI:10.1116/1.5039514, 2018.
2. Howell, C.; Grinthal, A.; Sunny, S.; Aizenberg, M.; Aizenberg, J. Designing liquid-infused surfaces for medical applications: a review. *Invited review in Advanced Materials, accepted.* DOI:10.1002/adma.201802724, 2018.
3. Paredes, J.; Shaler, S.; Howell, C.; Jakes, J. Influence of hot water extraction on cell wall and OSB strand mechanics. *Wood Science and Technology,* **51**: 1307-1319, 2017.
4. Overton, J.; Weigang, A.; Howell, C. Passive flux recovery in protein-fouled liquid-gated membranes. *Journal of Membrane Science,* **539**: 257-262, 2017.
5. Kovalenko, Y.; Sotiri, I.; Timonen, J.V.I.; Overton, J.; Holmes, G.; Aizenberg, J.; Howell, C. Bacterial Adhesion to Immobilized Liquid Layers under Dynamic Conditions. *Advanced Healthcare Materials,* 1600948, 2017.
6. Chen, J.; Howell, C**.;** Haller, C.; Ayala, P.; Moravec, K.; Dai, E.; Liu, L.; Sotiri, I.; Aizenberg, M.; Aizenberg, J.; Chaikof, E. An Immobilized Liquid Interface Prevents Device Associated Bacterial Infection In Vivo. *Biomaterials*, **113**: 80-92,2017.
7. Sunny, S.; Cheng, G.; Daniel, D.; Lo, P.; Ochoa, S.; Howell, C.; Vogel, N.; Majid, A.; Aizenberg, J. Transparent antifouling material for improved operative field visibility in endoscopy. *Proceedings of the National Academy of Sciences*, **113**: 11676-11681, 2016.
8. Sotiri, I.; Overton, J.; Waterhouse, A.; Howell C. Immobilized liquid layers: a new approach to anti-adhesion surfaces for medical applications. *Experimental Biology and Medicine,* **241**: 909-918, 2016.
9. Tesler, A.; Kim, P.; Kolle, S.; Howell, C.; Ahanotu, O.; Aizenberg, J. Extremely durable biofouling-resistant metallic surfaces based on electrodeposited nanoporous tungstate films on steel. *Nature Communications,* **6**:8649-1-10, 2015.
10. Howell, C.; Vu, T.; Johnson, C.; Hou, X.; Ahanotu, O.; Alvarenga, J.; Leslie, D.; Uzun, O.; Waterhouse, A.; Kim, P.; Super, M.; Aizenberg, M.; Ingber, D.; Aizenberg, J. Stability of Surface-Immobilized Lubricant Interfaces Under Flow. *Chemistry of Materials,* **27**: 1792-1800, 2015.
11. MacCallum, N.; Howell, C.; Kim, P.; Sun, D.; Friedlander, R.; Ranisau, J.; Ahanotu, O.; Lin, J.; Hatton, B.; Wong, T.-S.; Aizenberg, J. Oil-infused silicone tubing as a biofouling-free medical material. *ACS Biomaterials Science and Engineering,* **1**: 43-51, 2015.

12. Howell, C.; Vu, T.; Lin, J.; Kolle, S.; Juthani, N.; Watson, E.; Weaver, J.; Alvarenga, J.; Aizenberg, J. Self-replenishing vascularized fouling-release surfaces. *ACS Applied Materials and Interfaces*, **6**: 13299-13307, 2014.
13. Sunny, S.; Vogel, N.; Howell, C.; Vu, T.; Aizenberg, J. Lubricant-Infused Nanoparticulate Coatings Assembled by Layer-by-Layer Deposition. *Advanced Functional Materials,* **24:** 6658-6667, 2014.
14. Leslie, D.; Waterhouse, A.; Berthet, J.; Valentin, T.; Watters, A.; Jain, A.; Kim, P.; Hatton, B.; Nedder, A.; Mullen, K.; Super, E.; Howell, C.; Johnson, C.; Vu, T.; Rifai, S.; Hansen, A.; Aizenberg, M.; Super, M.; Aizenberg, J.; Ingber, D. A Bioinspired Surface Coating for Medical Devices that Prevents Thrombosis and Biofouling. *Nature Biotechnology,* **32:** 1134-1140, 2014.
15. Howell, C.; Hamoudi, H.; Koelsch, P.; Zharnikov, M. Thymine/adenine diblocks-oligonucleotide monolayers and hybrid brushes on gold: a spectroscopic study. *Biointerphases* **8**: 6, 2013.
16. Hastrup, A.; Howell, C.; Larsen, F.; Goodell, B.; Jellison, J. Differences in modification of crystalline cellulose due to degradation by brown and white rot fungi. *Fungal Biology,* **116:** 1052-1063, 2012.
17. Howell, C.; Jeyachandran, Y.; Koelsch, P.; Zharnikov, M. Orientation and ordering in sequence- and length-mismatched surface-bound DNA hybrids. *Journal of Physical Chemistry C,* **116:** 11133-11140, 2012.
18. Bruns, M.; Barth, C.; Bruener, P.; Engin, S.; Grehl, T.; Howell, C.; Koelsch, P.; Mack, P.; Nagel, P.; Trouillet, V.; Wedlich, D.; White, R. Structure and chemical composition of mixed benzylguanine- and methoxy-terminated self-assembled monolayers for immobilization of biomolecules. *Surface and Interface Analysis* **44:** 909-913, 2012.
19. Howell, C.; Hamoudi, H.; Koelsch, P.; Zharnikov, M. Orientation changes in surface-bound hybridized DNA undergoing preparation for ex situ spectroscopic measurements. *Chemical Physics Letters,* **513:** 267-270, 2011.
20. Howell, C.; Zhao, J.; Koelsch, P.; Zharnikov, M. Hybridization in ssDNA films- a multi-technique spectroscopy study. *Physical Chemistry Chemical Physics* **13:** 15512-15522, 2011.
21. Howell, C.; Hastrup, A. C.; Jara, R.; Larsen, F.; Goodell, B.; Jellison, J. Changes in wood crystalline cellulose structure caused by hot-water extraction and brown-rot decay. *Cellulose*, **18:** 1179-1190, 2011.
22. Schreiner, S.; Hatch, A.; Shudy, D.; Howard, D.; Howell, C.; Zhao, J.; Koelsch, P.; Zharnikov, M.; Petrovykh, D. Y.; Opdahl, A. Impact of DNA-surface interactions on the stability of DNA hybrids. *Analytical Chemistry,* **83:** 4288-4295, 2011.
23. Hastrup, A. C.; Howell, C.; Jensen, B.; Green, F. Non-enzymatic depolymerization of cotton cellulose by fungal mimicking metabolites. *International Biodeterioration and Biodegradation*, **65:** 553–559, 2011.
24. Howell, C.; Maul, R.; Wenzel, W.; Koelsch, P. Interactions of hydrophobic and hydrophilic self-assembled monolayers with water as probed by sum-frequency-generation spectroscopy. *Chemical Physics Letters,* **494:** 193–197, 2010.
25. Diesner, M.; Howell, C.; Kurz, V.; Verreault, D.; Koelsch, P. In vitro characterization of surface properties through living cells. *Journal of Physical Chemistry Letters,* **1:** 2339–2342, 2010.

26. Verreault, D.; Kurz, V.; Howell, C.; Koelsch, P. Measuring cells for probing solid/liquid interfaces with broadband sum-frequency-generation spectroscopy. *Review of Scientific Instruments*, **81:** 063111, 2010.
27. Howell, C.; Paredes, J.; Jellison, J. Decay resistance properties of hot water extracted oriented strandboard. *Wood and Fiber Science,* **41:** 201–208, 2009.
28. Paredes, J.; Mills, R.; Howell, C.; Shaler, S.; Gardner, D.; van Heiningen, A. Surface characterization of Red Maple strands after hot water extraction. *Wood and Fiber Science,* **41**: 38-50.
29. Howell, C.; Hastrup, A. C.; Goodell, B.; Jellison, J. Temporal changes in wood crystalline cellulose during degradation by brown rot fungi. *International Biodeterioration and Biodegradation,* **63:** 414–419, 2009.
30. Howell, C.; Diesner, M.; Grunze, M.; Koelsch, P. Probing the extracellular matrix with sum-frequency-generation spectroscopy. *Langmuir*, **24:** 13819–13821, 2008.
31. Howell, C.; Schmidt, R.; Kurz, V.; Koelsch, P. Sum-frequency-generation spectroscopy of DNA films in air and aqueous environments. *Biointerphases*, **3:** FC47–FC51, 2008.

Conference Proceedings

1. Howell, C.; Paredes, J.; Shaler, S.; Jellison, J. “Decay resistance properties of hemicellulose extracted oriented strand board”. *International Research Group on Wood Protection Series*, IRG/WP 08-10644, 2008.
2. Howell, C.; Hastrup, A. C.; Jellison, J. “The use of X-ray diffraction for analyzing biomodification of crystalline cellulose by wood decay fungi”. *International Research Group on Wood Protection Series*, IRG/WP 07-10622, 2007.
3. Howell,C.; Jellison, J. “Biological variability in the oxalate/oxalate decarboxylase system among five isolates of the wood-degrading fungus Meruliporia incrassata.” *International Research Group on Wood Protection* Series, IRG/WP 06-10573, 2006.
4. Howell, C.; Gott, L.; Meehan, B. “Fun with soil block jars: Teaching fungal wood decay in the classroom”. *International Research Group on Wood Protection Series,* IRG/WP 06-10574, 2006.
5. Jellison, J.; Howell, C.; Goodell, B.; Quarles, S. “Investigations into the biology of Meruliporia incrassata”. *International Research Group on Wood Protection Series,* IRG/WP 04-10508, 2004.

Patents

1. Aizenberg J, Aizenberg M, Cui J, Dunn S, Hatton B, Howell C, Kim P, Wong TS, Yao X “Slippery Self-Lubricating Polymer Surfaces” US 9,963,597 B2. May 8th, 2018

For a complete updated list of publications and Patents, see Google Scholar Citations or Research Gate

Invited Oral Presentations

1. Howell C. “Bacterial interactions with immobilized liquid layers” Colloids and Biointerfaces Division, ACS 255th Annual Spring Meeting, New Orleans, LA, March 18th, 2018.
2. Howell C, Aizenberg J. “Say no to biofouling: slippery coatings that resist adhesion of biological matter” 64th AVS International Symposium and Exhibition, Tampa, FL, November 1st, 2017.
3. Howell C. “Bio-inspired materials interfaces for biological control” Biointerfaces Division Plenary Lecture, 64th AVS International Symposium and Exhibition, Tampa, FL, November 1st, 2017.
4. Howell C. “Immobilized Liquids as Optically Transparent Antifouling Surfaces in Medicine” Canadian Society for Chemistry 2017 Conference and Exhibition, May 29th, 2017.
5. Howell C. “Bio-inspired engineering of surfaces for biological control” 44th Maine Biological and Medical Sciences Symposium, MDI Biological Laboratory, April 29th, 2017.
6. Howell C, Juthani N, Aizenberg J. “Infused Polymers for Cell Sheet Release” Fourth Workshop in Micro- and Nanotechnologies for Medicine, Boston, MA, July 25th, 2016.
7. Howell, C.; Aizenberg, J. “Everything SLIPS: No Bacteria Left Behind” ASM 7th Conference on Biofilms, Chicago, IL. October 2015.
8. Howell, C.; Aizenberg, J. “Preventing biological adhesion using liquid-infused materials” Chemical and Physical Strategies to Regulate Biological Adhesion session at the BioInterface 2015 Annual Symposium, Scottsdale, AZ. September 2015.
9. Howell, C.; Aizenberg, J. “Everything SLIPS: No Bacteria Left Behind” Anti-Biofilm technologies: Pathways to Product Development, Washington, D.C.. February 2015.
10. Howell, C. “Lessons from nature: using bio-inspiration to create the next generation of cutting-edge materials” Department of Chemical and Biological Engineering Seminar Series, University of Maine, Orono, ME. January 2014.
11. Howell, C. “Lessons from nature: using bio-inspiration to create the next generation of cutting-edge materials ,” Department of Sustainable Biomaterials Seminar Series, Virginia Polytechnic Institute, Blacksburg, VA, January 2014.
12. Howell, C. “Non-linear optical spectroscopy, Part II: Biological applications.” Spectroscopy Workshop, Biointerfaces Graduate Schoool, Karlsruhe Institute of Technology, Karlsruhe, Germany. October 2009.
13. Howell, C.; Koelsch, P. “Characterization of model biological monolayers in- and ex-situ.” Biointerfaces Programme Grant Proposal, Karlsruhe Institute of Technology, Karlsruhe, Germany, June 10th, 2009.
14. Howell, C. “Understanding biointerfaces in air and aqueous environments using sum-frequency generation spectroscopy.” Surface Chemistry Branch, Naval Research Laboratory, Washington D.C. August 2008.
15. Howell, C. “Temporal changes in cellulose crystallite size during degradation by brown rot fungi.” Institute of Wood Biology and Wood Technology. Georg-August-Universität Göttingen, Germany. November 2007.