



Northeastern

Department of Civil and Environmental Engineering Distinguished Seminar Series

MicrobiHomes: managing building plumbing biofilms through material selection

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Group Leader

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Swiss Federal Institute of Aquatic Sciences and Technology

Duebendorf, Switzerland

Monday, November 21, 2016 12:00 pm-1:00pm

458 Richards Hall

Abstract

Synthetic materials used throughout building plumbing (e.g., water pipes, shower hoses, sealing rings) provide abundant nutrients for microbial growth through the leaching of organic carbon. As such, the quantity and composition of leached nutrients is a determining factor for the quantity and composition of biofilms growing on these materials, and thus eventually exposed to consumers. In this presentation we will highlight recent scientific and technological advances in this field, focussing on (1) how material choice affects the microbiome, (2) how household plumbing materials can and should be tested, and (3) how biofilms on drinking water pipe materials interact with the water phase, and what this means for the end-user. We finally explore some concepts of how such knowledge can be used in the future to effectively select, control and manage building plumbing microbiomes through pre- and probiotic strategies.

Biographical Sketch

Frederik Hammes leads the drinking water microbiology group at the Swiss Federal Institute of Aquatic Science and Technology (Eawag). The group's research focus on understanding microbial ecology and dynamics in drinking water systems from source to tap, with emphasis on the development and application of new detection methods. Frederik is the author/co-author of 70 publications in this field. He studied microbiology in South Africa and Belgium, did a post-doc in Switzerland and now lead the Drinking Water Microbiology group at Eawag. His main interest is in understanding drinking water as a complex ecological environment inhabited by diverse microbial communities. We focus on measuring and understanding the dynamics of bacteria in drinking water treatment and distribution systems. To do that he has established flow cytometry as a main method and developed fully automated online and realtime flow cytometric systems for high frequency monitoring. In addition, his research focus on the nutrients - particularly organic carbon - which these microbes use for their proliferation. Caitlin Proctor, who contributed significantly to this work, is a final year PhD student who's research focus on characterising and understanding biofilm formation on materials in contact with drinking water, with specific emphasis on shower hoses.



Frederik Hammes, PhD

Group Leader, Drinking Water Microbiology Research Group

Swiss Federal Institute of Aquatic Science and Technology

(Eawag)



Education

- **Ph.D., (Microbial Ecology and Technology), Ghent University, Ghent, Belgium**
- **M.Sc., (Environmental Science and Technology), Ghent University, Ghent, Belgium**
- **B.Sc., (Microbiology), University of Pretoria, South Africa**

Research Interests

- **Bacterial dynamics in drinking water**
- **Biological filtration and stability**
- **Materials in contact with drinking water**
- **Premise plumbing microbiology**
- **Fully automated online and real-time flow cytometric systems for high frequency monitoring**

Selected Service and Awards

- **Author/co-author of 70 publications in Microbiology Ecology and Dynamics in Drinking water field**
- **Senior Researcher, Eawag, 2008-2012**
- **Postdoctoral Researcher, Environmental Microbiology, Eawag, 2003-2008**