

Drinking Water Disinfection By-Products

Gordon Research Conference

Disinfection 2100: Linking Engineering, Chemistry, Toxicology and Epidemiology to Reduce Exposure to Toxicity Drivers While Curtailing Pathogens

Dates

July 30 - August 4, 2017

Location

Mount Holyoke College
South Hadley, MA

Organizers

Chair:

[William A. Mitch](#)

Vice Chair:

[Xingfang Li](#)

Application Deadline

Applications for this meeting must be submitted by **July 2, 2017**. Please apply early, as some meetings become oversubscribed (full) before this deadline. If the meeting is oversubscribed, it will be stated here. *Note:* Applications for oversubscribed meetings will only be considered by the Conference Chair if more seats become available due to cancellations.

Meeting Description

The 2017 meeting has two main goals. The first goal is to broaden the scope beyond DBP formation within conventional drinking water plants. Disinfection represents a balance between controlling the acute risk associated with pathogens and the chronic risk linked to DBPs. The first two sessions will address this balance directly. The first session will evaluate disinfectant reactions with pathogens, recognizing that the biomolecular transformations responsible for pathogen kill are DBPs. The second session will cover tradeoffs between microbial growth and DBPs within distribution systems, the least evaluated sector of drinking water systems. The sixth section will focus on DBPs in wastewater recycling, particularly which DBPs contribute most to toxicity and how to control them. The conference will also include new arenas for DBPs, including a talk by Clorox on disinfectant design for consumer applications, and the formation of DBPs during food processing.

The second goal is to move towards a solution to the DBP problem. A major strength of this conference is that it brings together engineers, chemists, toxicologists, epidemiologists and regulators, the key players for addressing this problem. Previous conferences have concluded that there is no feasible way to control pathogens without producing DBPs, so the challenge is to achieve the best balance that minimizes exposure to the DBPs driving risk. Sessions will link chemistry and toxicology to identify these toxicity drivers. Session 8 will feature discussions among chemists, exposure experts and epidemiologists about how the ideal epidemiology study should be designed to provide the evidence to link exposure to human health risks. Session 9 will conclude with presentations and a discussion regarding how to design water treatment systems that minimize toxicity drivers, including a presentation from a Dutch utility on how to avoid the use of disinfectants in drinking water distribution systems.

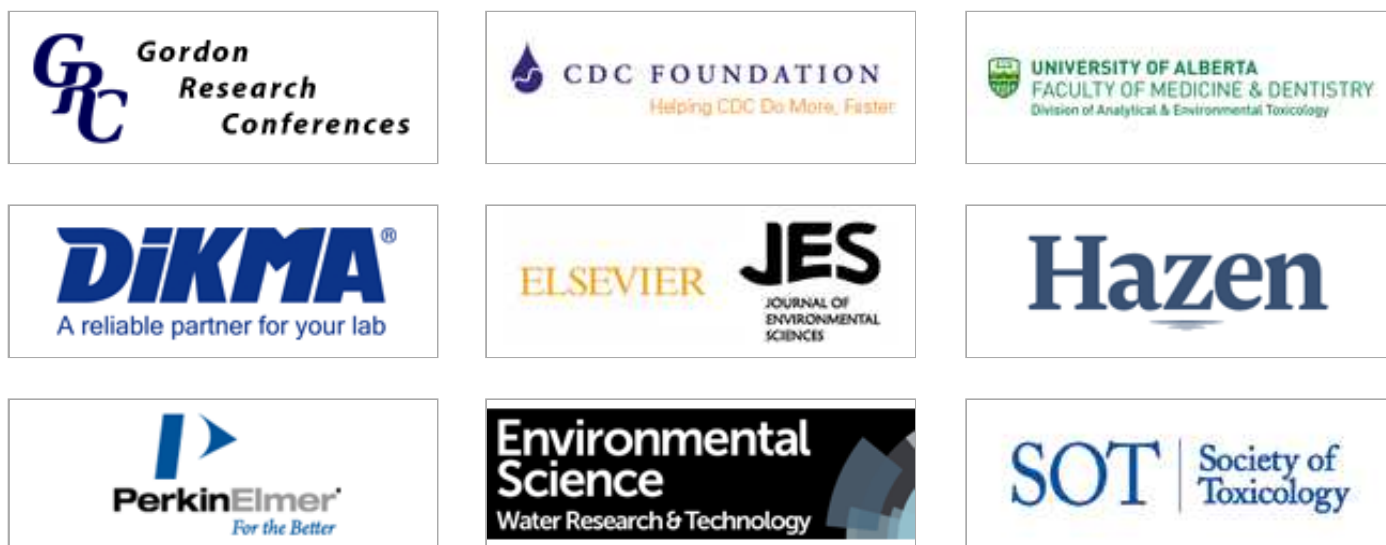
Related Meeting



This GRC will be held in conjunction with the "**Drinking Water Disinfection By-Products**" Gordon Research Seminar (GRS). Those interested in attending both meetings must submit an application for

the GRS in addition to an application for the GRC. Refer to the [associated GRS program page](#) for more information.

Contributors



Meeting Program

Sunday

- 2:00 pm - 9:00 pm Arrival and Check-in
- 6:00 pm Dinner
- 7:30 pm - 7:40 pm Welcome / Introductory Comments by GRC Site Staff
- 7:40 pm - 9:30 pm **Disinfectants vs. Microorganisms: Biomolecule Transformation Products Are DBPs**
- Discussion Leader: **Krista Wigginton** (University of Michigan, USA)
- 7:40 pm - 7:45 pm Opening Remarks
- 7:45 pm - 7:50 pm Introduction by Discussion Leader
- 7:50 pm - 8:30 pm **Tamar Kohn** (École Polytechnique Fédérale de Lausanne, Switzerland)
"How Do Disinfectants Kill Pathogens?"
- 8:30 pm - 8:45 pm Discussion
- 8:45 pm - 9:15 pm **William Smith** (Clorox Company, USA)
"Bringing a Household Disinfecting Product to Market"
- 9:15 pm - 9:30 pm Discussion

Monday

- 7:30 am - 8:30 am Breakfast
- 8:30 am Group Photo
- 9:00 am - 12:30 pm **Microorganisms vs. DBPs in Distribution Systems - The Final Frontier**
- Discussion Leader: **Benito Marinas** (University of Illinois, USA)
- 9:00 am - 9:05 am Introduction by Discussion Leader
- 9:05 am - 9:45 am **Wen-Tso Liu** (University of Illinois at Urbana-Champaign, USA)

"Drinking Water Microbiome in Distribution Systems"

9:45 am - 10:00 am Discussion

10:00 am - 10:30 am Coffee Break

10:30 am - 11:10 am **Gerald Speitel** (University of Texas at Austin, USA)
"DBPs and Biofilm Interactions in Distribution Systems"

11:10 am - 11:30 am Discussion

11:30 am - 12:10 pm **Mark LeChevallier** (American Water Company, USA)
"Minimizing Microorganisms and DBPs in Distribution Systems"

12:10 pm - 12:30 pm Discussion

12:30 pm Lunch

1:30 pm - 4:00 pm Free Time

4:00 pm - 6:00 pm Poster Session

6:00 pm Dinner

7:30 pm - 9:30 pm **Merging Chemistry and Toxicology**Discussion Leader: **Guibin Jiang** (Chinese Academy of Sciences, China)

7:30 pm - 7:35 pm Introduction by Discussion Leader

7:35 pm - 8:05 pm **Xiangru Zhang** (Hong Kong University of Science and Technology, Hong Kong SAR China)
"TOX Evolution from High Molecular Weight DBPs to Aromatics to Aliphatics"

8:05 pm - 8:20 pm Discussion

8:20 pm - 8:45 pm **Xingfang Li** (University of Alberta, Canada)
"Identification of New DBPs of Health Relevance: Analytical and Toxicological Studies"

8:45 pm - 8:55 pm Discussion

8:55 pm - 9:20 pm **Hailin Wang** (Chinese Academy of Sciences, China)
"Analysis of DNA Methylation and Related Oxidation Products for Testing DBP Epigenotoxicity"

9:20 pm - 9:30 pm Discussion

Tuesday

7:30 am - 8:30 am Breakfast

9:00 am - 12:30 pm **Frontiers in DBP Chemistry and Engineering**Discussion Leader: **William Cooper** (National Science Foundation, USA)

9:00 am - 9:05 am Introduction by Discussion Leader

9:05 am - 9:45 am **Raymond Hozalski** (University of Minnesota, USA)
"Remote Sensing for Source Water Characterization"

9:45 am - 10:00 am Discussion

10:00 am - 10:30 am Coffee Break

10:30 am - 11:00 am **Michael Gonsior** (University of Maryland, USA)
"What Are High Molecular Weight Disinfection By-Products? New Insights from Non-Targeted Ultrahigh Resolution Mass Spectrometry"

11:00 am - 11:10 am Discussion

11:10 am - 11:40 am **Ching-Hua Huang** (Georgia Institute of Technology, USA)
"F-DBPs - DBPs from Food Processing"

- 11:40 am - 11:50 am Discussion
- 11:50 am - 12:20 pm **Chao Chen** (Tsinghua University, China)
"Nitrosamine Precursor Characterization, Tracing and Control: Some New Insights by the Polarity Rapid Assessment Method (PRAM)"
- 12:20 pm - 12:30 pm Discussion
- 12:30 pm Lunch
- 1:30 pm - 4:00 pm Free Time
- 4:00 pm - 6:00 pm Poster Session
- 6:00 pm Dinner

Linking Toxicology and Exposure Assessment: Which DBPs Are the Toxicity Drivers in Drinking Waters?

Discussion Leader: **Jane Simmons** (U.S. Environmental Protection Agency, USA)

- 7:30 pm - 7:35 pm Introduction by Discussion Leader
- 7:35 pm - 8:15 pm **Michael Plewa** (University of Illinois at Urbana-Champaign, USA)
"Toxicity Forcing Agents for Conventional Drinking Waters"
- 8:15 pm - 8:30 pm Discussion
- 8:30 pm - 9:10 pm **Weidong Qu** (Fudan University, China)
"Exposure Assessment of DBPs in China and Potential Adverse Effects"
- 9:10 pm - 9:25 pm Discussion
- 9:25 pm - 9:30 pm General Discussion

Wednesday

- 7:30 am - 8:30 am Breakfast
- 9:00 am - 12:30 pm **Wastewater Recycling and DBPs: Which DBPs Matter and How Can We Control Them?**
- Discussion Leader: **Paul Westerhoff** (Arizona State University, USA)
- 9:00 am - 9:05 am Introduction by Discussion Leader
- 9:05 am - 9:45 am **Shane Snyder** (University of Arizona, USA)
"Forcing Agents for Potable Reuse - What Really Matters?"
- 9:45 am - 10:00 am Discussion
- 10:00 am - 10:30 am Coffee Break
- 10:30 am - 11:00 am **Urs Von Gunten** (Eawag, Swiss Federal Institute of Aquatic Science and Technology, Switzerland)
"O3/BAC as a Treatment Option for Potable Reuse Trains"
- 11:00 am - 11:10 am Discussion
- 11:10 am - 11:40 am **Jurg Keller** (University of Queensland, Australia)
"Intersection of Potable Reuse Treatment Objectives and DBPs"
- 11:40 am - 11:50 am Discussion
- 11:50 am - 12:20 pm **Chii Shang** (The Hong Kong University of Science and Technology, Hong Kong SAR China)
"UV/Chlorine Process - Degradation of CECs vs. Formation of DBPs"
- 12:20 pm - 12:30 pm Discussion
- 12:30 pm Lunch
- 1:30 pm - 4:00 pm Free Time

4:00 pm - 6:00 pm Poster Session

6:00 pm Dinner

7:30 pm - 9:30 pm **Promises and Pitfalls of High Throughput Toxicological Bioassays**

Discussion Leader: **Beate Escher** (Helmholtz Centre for Environmental Research, Germany)

7:30 pm - 7:35 pm Introduction by Discussion Leader

7:35 pm - 8:15 pm **Frederic Leusch** (Griffith University, Australia)
"The Case for High Throughput"

8:15 pm - 8:30 pm Discussion

8:30 pm - 9:10 pm **Matias Attene Ramos** (George Washington University, USA)
"Cautions for High Throughput"

9:10 pm - 9:25 pm Discussion

9:25 pm - 9:30 pm General Discussion

Thursday

7:30 am - 8:30 am Breakfast

8:30 am - 9:00 am Business Meeting

Nominations for the Next Vice Chair; Fill in Conference Evaluation Forms; Discuss Future Site and Scheduling Preferences; Election of the Next Vice Chair

9:00 am - 12:30 pm **Designing the Ideal Epidemiology Study of the Future**

Discussion Leader: **Michael Wright** (National Center for Environmental Assessment, U.S. Environmental Protection Agency, USA)

9:00 am - 9:05 am Introduction by Discussion Leader

9:05 am - 9:15 am Short Talk Selected from Poster Abstracts

9:15 am - 9:20 am Discussion

9:20 am - 9:30 am Short Talk Selected from Poster Abstracts

9:30 am - 9:35 am Discussion

9:35 am - 9:45 am Short Talk Selected from Poster Abstracts

9:45 am - 9:50 am Discussion

9:50 am - 10:20 am Coffee Break

10:20 am - 10:25 am Introduction by Discussion Leader

10:25 am - 10:50 am **Stuart Krasner** (Metropolitan Water District of Southern California, USA)
"What's Feasible to Measure - Can Correlations Be Made?"

10:50 am - 11:00 am Discussion

11:00 am - 11:25 am **John Nuckols** (Colorado State University, USA)
"How Can We Improve DBP Exposure Assessment?"

11:25 am - 11:35 am Discussion

11:35 am - 12:00 pm **Manolis Kogevinas** (Centre for Research in Environmental Epidemiology, Spain)
"Constraints for Conducting Epidemiology Studies"

12:00 pm - 12:10 pm Discussion

12:10 pm - 12:30 pm General Discussion

12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	<u>Poster Session</u>
6:00 pm	Dinner
7:30 pm - 9:30 pm	Disinfection Systems of the Future: How Can We Minimize Toxicity Drivers?

Discussion Leader: **Susan Richardson** (University of South Carolina, USA)

7:30 pm - 7:35 pm	Introduction by Discussion Leader
7:35 pm - 8:15 pm	Bram Martijn (PWN Technologies, The Netherlands) "How to Run a Disinfectant-Free Distribution System"
8:15 pm - 8:30 pm	Discussion
8:30 pm - 9:00 pm	Stig Regli (U.S. Environmental Protection Agency, USA) "New Regulatory Approaches to Minimizing DBP Toxicity Drivers"
9:00 pm - 9:10 pm	Discussion
9:10 pm - 9:30 pm	General Discussion

Friday

7:30 am - 8:30 am	Breakfast
9:00 am	Departure