**Abstract**

**Presentation title: Employing Multidimensional Bioanalysis to Reveal the Bacterial and Viral Inactivation Mechanisms of Peroxyacids and Chlorine Disinfectants**

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**Abstract (250-300 words):**

Disinfection processes are pivotal for public health and global well-being. However, disinfection performance has been usually evaluated by merely plate cultivation methods, while the bacterial and viral inactivation mechanisms of different disinfectant requires further investigation. Herein, we chose two disinfectants that has been extensively applied in Europe, and employed multidimensional bioanalysis, including plate cultivation, (RT-)qPCR, flow cytometry, and fluorescence microscopy to investigate the disinfection mechanisms. Overall, we found chlorine non-selectively damaged cell membrane, nucleic acids, and proteins. However, peroxyacids selectively target S-containing proteins, while reacted negligibly with cell membrane and nucleic acids. Hence peroxyacid disinfection could not be detected by (RT-)qPCR and flow cytometry. These results shed light on disinfection evaluation and disinfectant selection in medical and municipal disinfection ptocesses.

**Biography (150-200 words):**

Junyue Wang is currently a research associate at Carbon Reduction Center and the Department of Chemical Engineering at Yale University. Before that, he finished his PhD at Georgia Institute of Technology in 2024, and his master and bachelor degrees at Stanford and Tongji University, respectively. His research main focuses on innovative physical-chemical processes, pathogens and organic contaminants, and advanced analytical technology.