



MWOA Laboratory Workshop June 15-16, 2022

The Inn on Lake Superior
(Conference Center)
350 Canal Park Drive
Duluth, MN 55802

Day One

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| 8:00 – 8:15 | Registration |
| 8:15 – 8:30 | Welcome Toni Glymph – Wastewater Microbiology Solutions |
| 8:30 – 9:30 | Introduction to Microscopy Slide preparation, Sampling, Hands-on Activity |
| 9:30 – 11:00 | Wastewater Microbiology The Role of Bacteria, Growth Characteristics, Parameters Affecting Their Growth (oxygen, sludge age, F:M ratio), Hands-on activity |
| 11:00 – 12:00 | The Role of Protozoa and Metazoans Parameters Affecting Their Growth, Identifying Protozoa & Metazoans |
| 12:00 – 1:00 | Lunch |
| 1:00 – 2:15 | Process Control Using the Microscope Dispersed Bacteria, Protozoa & Metazoa: Relative Dominance, Slime Bulking & Nutrient Deficiency, Toxicity |
| 2:15 – 4:00 | Microorganisms Response to Unfavorable Conditions Bacteria – Zooglea, Bacteria – Exocellular Lipopolysaccharide, Protozoa & Metazoans – Shelled (Testate) species |

Day Two

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| 8:00 – 8:45 | What are Filamentous Bacteria? Conditions That Favor Their Growth |
| 8:45 – 9:00 | Sampling and Staining Slide preparation, Hands-on activity |
| 9:00 – 10:00 | Filamentous Bacteria Characteristics - Cell size and Shape Sheath and Motility, Attached Growth, Sulfur Granules, Hands-on activity |
| 10:00 – 12:00 | A Simply Approach to Identification and Control Bulking Filaments, Foaming Filaments, Staining, Hands-on Activity |
| 12:00 – 1:00 | Lunch Break |
| 1:00 – 2:00 | Filamentous Bacteria Counting Hands-on Activity, Case Studies |
| 2:00 – 4:00 | Microbiological Monitoring of EBPR Systems PAOs, PHB, POLYp and GAOs, PHB and Neisser Staining, Quantifying PAOs and GAOs, Hands-on Activity |

Attendees are encouraged to bring a microscope and mixed liquor sample for hands on examination!

13.5 Direct WW contact hours for attending both days