GlycoMIP Summer School 2021

Monday, June 7 thru Friday, June 11

A GlycoMIP Education & Outreach Event

Agenda (**NOTE:** All times are shown in Eastern Daylight Savings Time, EDT)**:**

DAY ONE, June 7:

10:45 a.m.	**Getting online and Check-In** (Caudill)
11:00 a.m.	**GlycoBasics I** (Instructor: Maren Roman) Welcome and Introductions (Roman, Caudill) ✓ Classes of glycomaterials ✓ Natural occurrence and functions of glycomaterials ✓ Glycomaterials-based technologies
12:00 p.m.	Break
12:10 p.m.	**GlycoBasics II** (Instructor: Kevin Edgar) ✓ Building blocks of polysaccharides (PS) ✓ Natural occurrence and functions of polysaccharides ✓ Polysaccharide-based technologies
1:10 p.m.	Extended Break
2:30 p.m.	**Synthesis: Fundamentals** (Instructor: Peter Seeberger) ✓ Protecting groups ✓ Formation of glycosidic linkage ✓ Oligosaccharide synthesis strategies
3:30 p.m.	Break
3:40 p.m.	**Synthesis: Application** (Instructor: Peter Seeberger) ✓ History of automated glycan assembly (AGA) ✓ Opportunities for AGA in glycomaterials R&D ✓ Current limitations of AGA
4:40 p.m.	Adjourn

DAY TWO, June 8:

10:45 a.m.	**Getting online and Check-In** (Caudill)
11:00 a.m.	**Analytical: Mass Spectrometry – Fundamentals** (Instructor: Rich Helm) ✓ Mass spectrometry basics

	✓ Mass spectrometry and LCMS hardware ✓ Basic experiments using MALDI and LCMS technologies
12:00 p.m.	Break
12:10 p.m.	**Analytical: Mass Spectrometry – Application** (Instructor: Parastoo Azadi) ✓ Sample type and preparation/isolation/purification ✓ Derivatization of glycans for glycan mass spectrometry ✓ Fragmentation of glycans for sequencing and linkage formation
1:10 p.m.	Extended Break
2:30 p.m.	**Analytical: Nuclear Magnetic Resonance (NMR) – Fundamentals** (Instructor: John Glushka) ✓ Experimental concepts, chemical shifts, J-coupling, relaxation ✓ Types of NMR spectra (1D 1H, 13C; 2D 1H, 1H-13C correlation) ✓ Key experimental parameters for carbohydrate NMR data
3:30 p.m.	Break
3:40 p.m.	**Analytical: NMR – Application** (Instructor: Christian Heiss) ✓ Utility of 2D NMR experiments ✓ Special considerations for the NMR of carbohydrates ✓ Interpretation of carbohydrate spectra
4:40 p.m.	Adjourn

DAY THREE, June 9:

10:45 a.m.	**Getting online and Check-In** (Caudill)
11:00 a.m.	**Analytical: Carbohydrate – Protein Binding Assays – Fundamentals** (Instructor: Alan Esker) ✓ General principles ✓ Methods – SPR, BLI, MST and ITC
12:00 p.m.	Break
12:10 p.m.	**Analytical: Carbohydrate – Protein Binding Assays – Application** (Instructor: Rob Woods) ✓ Binding assay (K_d, IC_{50}, etc.) ✓ Example applications of BLI ✓ Limitations of BLI (and other methods)
1:10 p.m.	Extended Break
2:30 p.m.	**Analytical: Rheometry – Fundamentals** (Instructor: Blake Johnson) ✓ Rheometry basics ✓ Rheometry hardware ✓ Basic rheometry applications in biomaterials analysis
3:30 p.m.	Break

3:40 p.m.	**Analytical: Rheometry – Application** (Instructor: Ross Clark) ✓ Selecting an appropriate methodology for the test ✓ Some common examples (inkjet printing, cosmetics, beverage mouthfeel, emulsion stability, fire retardant application) ✓ Common errors made in test selection and application
4:40 p.m.	Adjourn

DAY FOUR, June 10:

10:45 a.m.	**Getting online and Check-In** (Caudill)
11:00 a.m.	**Modeling: Computational Methods for Glycomaterials – Fundamentals** (Instructor: Valerie Welborn) ✓ Overview of computational methods ✓ Applications of quantum mechanics-based methods ✓ Applications of molecular mechanics-based methods
12:00 p.m.	Break
12:10 p.m.	**Modeling: Computational Methods for Glycomaterials – Application** (Instructor: Rob Woods) ✓ Docking carbohydrates to proteins ✓ Glycoscience applications of MD simulations ✓ Limitations of MD simulations ✓ Capabilities of Glycam.org
1:10 p.m.	Extended Break
2:30 p.m.	**Analytical: Chiroptical Spectroscopy – Fundamentals** (Instructor: Daniel Crawford) ✓ Chirality and optical properties ✓ Chirality and vibrational spectroscopy ✓ Challenges of chiroptical spectroscopy for carbohydrates
3:30 p.m.	Break
3:40 p.m.	**Analytical: Chiroptical Spectroscopy – Application** (Instructor: Prasad Polavarapu) ✓ Raman and Infrared spectroscopy fundamentals ✓ Vibrational circular dichroism of carbohydrates ✓ Raman optical activity of carbohydrates
4:40 p.m.	Adjourn

DAY FIVE, June 11:

10:45 a.m.	**Getting online and Check-In** (Caudill)

11:00 a.m.	**Interactive Panel Discussion #1: GlycoBasics and Synthesis** Panelists: ✓ Maren Roman ✓ Rich Helm ✓ Kevin Edgar
	Break
11:45 a.m.	**Interactive Panel Discussion #2: Modeling** Panelists: ✓ Rob Woods ✓ Valerie Welborn ✓ Sanket Deshmukh
	Break
12:30 p.m.	**Interactive Panel Discussion #3: Analytical** Panelists: ✓ Parastoo Azadi ✓ Alan Esker ✓ Christian Heiss
1:15 p.m.	Closing Remarks Evaluations
1:30 p.m.	Adjourn