

# Great Lakes Advanced Molecular Sciences: Stem Cell and Organoid Biology Course 2024

Holland, MI

June 21-25, 2024

## Friday, June 21

- 1:00 PM **Course check-in**  
Location: Bioeconomy Institute
- 2:00 PM Laboratory workshop: Bana Abolibdeh, Colin O'Hern and Aitor Aguirre  
**1. Fundamentals of cell culture and working in sterile conditions**  
**2. Site-specific biosafety training (required for all participants)**  
Location: Bioeconomy Institute Auditorium Room 4107
- 6:15 PM **Welcome Reception and Dinner**  
Location: Haworth Hotel and Conference Center
- 7:00 PM **Information and logistics for participants** (student teams, course materials)  
Location: Haworth Hotel and Conference Center
- 7:15 PM Lecture 1: Dr. Aitor Aguirre, Michigan State University  
Topic: **Introduction to pluripotent stem cells and organoids**  
Location: Haworth Hotel and Conference Center
- 8:00 PM Keynote presentation 1: Dr. Chaz Hong, Michigan State University  
Topic: **Patient-derived human iPSC-derived cardiomyocytes for pathophysiology and drug discovery**  
Location: Haworth Hotel and Conference Center

## Saturday, June 22

- 8:30 AM **Breakfast**  
Location: Bioeconomy Institute
- 9:15 AM Lecture 2: Dr. Peter Wang, Michigan State University  
Topic: **From Lab to Clinic: Advancing Type 1 Diabetes Treatment with Islet Organoids**  
Location: Bioeconomy Institute Auditorium Room 4107

- 10:00 AM Lecture 3: Dr. Owen Tamplin, University of Wisconsin-Madison  
Topic: **Hematopoietic Stem Cells**  
Location: Bioeconomy Institute Auditorium Room 4107
- 10:45 AM **Coffee break**  
Location: Bioeconomy Institute
- 11:00 AM Lecture 4: Dr. Yuan Wang, Michigan State University  
Topic: **Modeling mammalian germ cell development using pluripotent stem cells**  
Location: Bioeconomy Institute Auditorium Room 4107
- 11:45 AM **Break**
- 12:00 PM **Lunch**  
Location: Bioeconomy Institute
- 1:00 PM **Lab sessions: iPSC culture, maintenance, and cryopreservation**  
Instructors: Bana Abolibdeh & Colin O'Hern  
Lab prep session – general outlook and student expectations.  
Location: Bioeconomy Institute
- 1:30 PM Lab session 1: **iPSC thaw procedure, cells for student use.** A frozen vial of iPSC will be provided from stem cell core stock.  
Location: Bioeconomy Institute
- 4:00 PM Lab session 2: **ReLeSR passage – for cells that will be maintained for the duration of the course.** Additional ready-to-passage cells will be provided.  
Location: Bioeconomy Institute
- 6:00 PM **Dinner**  
Location: Haworth Hotel and Conference Center
- 7:00 PM Keynote presentation 2: Dr. Aaron Zorn, Cincinnati Children's Hospital  
Topic: **Foregut organogenesis from embryos to stem cell models**  
Location: Haworth Hotel and Conference Center
- 8:00 PM **Student introduction session** (elevator pitch/chalk talk presenting current research or research interests)  
Location: Haworth Hotel and Conference Center

## Sunday, June 23

- 8:30 AM      **Breakfast**  
Location: Bioeconomy Institute
- 9:15 AM      Lecture 5: Dr. Jeremy Prokop, Michigan State University  
Topic: **Genomics of iPSCs**  
Location: Bioeconomy Institute Auditorium Room 4107
- 10:00 AM      Lecture 6: Dr. Bin Gu, Michigan State University  
Topic: **2-Cell Based Genome Editing: From Developmental Biology to Disease Modeling**  
Location: Bioeconomy Institute Auditorium Room 4107
- 10:45 AM      **Coffee break**  
Location: Bioeconomy Institute
- 11:00 AM      Lecture 7: Dr. Jitao Zhang, Wayne State University  
Topic: **Advanced microscopy for mechanical imaging of cell and tissue**  
Location: Bioeconomy Institute Auditorium Room 4107
- 11:45 AM      **Break**
- 12:00 PM      **Lunch**  
Location: Bioeconomy Institute
- 1:00 PM      **Lab sessions: iPSC passaging, QC, and pluripotency testing**  
Instructors: Bana Abolibdeh & Colin O'Hern  
  
Lab session 3: **Media change and evaluation of ReLeSR passaged cells, quality control, cleaning differentiation, prepping antibody solutions for next day lab.** Differentiated cells will be provided for cleaning.  
Location: Bioeconomy Institute
- 4:00 PM      Lab session 4: **Accutase passage for setting up either embryoid bodies (EBs) or monolayers for iPSC differentiation.** Confluent cells, ready for passage will be provided.  
Location: Bioeconomy Institute
- 6:00 PM      **Dinner**  
Location: Tulyp Hotel
- 7:00 PM      Keynote presentation 3: Dr. Amy Ralston, Michigan State University  
Topic: **Making and using stem cells from the early embryo**

Location: Tulyp Hotel

8:00 PM **Career mentoring Q&A**  
Location: Tulyp Hotel

## Monday, June 24

*Hints cc* 8:30 AM **Breakfast**  
Location: Bioeconomy Institute

9:15 AM Lecture 8: Dr. David Jones, University of Michigan  
Topic: **iPSC models and electrophysiology of cardiac and neural development**  
Location: Bioeconomy Institute Auditorium Room 4107

10:00 AM Lecture 9: Dr. Concepcion Estarás, Temple University  
Topic: **Models of human heart development**  
Location: Bioeconomy Institute Auditorium Room 4107

10:45 AM **Coffee break**  
Location: Bioeconomy Institute

11:00 AM Lecture 10: Dr. Aitor Aguirre, Michigan State University  
Topic: **Synthetic heart models for the study of human cardiac development and disease**  
Location: Bioeconomy Institute Auditorium Room 4107

11:45 AM **Break**

12:00 PM Lunch and Learn session, Dr. Elena Demireva, Michigan State University  
Topic: **Introduction to CRISPR editing of iPSCs**  
Location: Bioeconomy Institute Auditorium Room 4107

1:00 PM **Lab sessions: iPSC differentiation methods and organoids**  
Instructors: Bana Abolibdeh, Colin O'Hern  
  
Lab session 5: **Observation of pre-made organoids (derived from EB formation on Sunday). Immunohistochemical detection of pluripotency markers in monolayer stem cells.** Fix, block, and apply primary Ab for immunostaining for SOX2 and Oct4.  
Location: Bioeconomy Institute

4:00 PM Lab session 6: **Freezing iPSCs**. Cells expanded in prior sessions will be used to practice freezing protocols. Complete immunostaining with secondary Ab plus DAPI stain and mount for imaging.  
Location: Bioeconomy Institute

6:00 PM **Dinner**  
Location: Holland Princess

7:00 PM Keynote presentation 4: Dr. Jonathan Silva, Washington University in St. Louis  
Topic: **Stem cell models of cardiotoxicity, RTKIs**  
Location: Holland Princess

8:00 PM **Awards presentation and student certificates**  
Location: Holland Princess

## Tuesday, June 25

Check out from the hotel before 11:00 AM

8:30 AM **Breakfast**  
Location: Bioeconomy Institute

9:15 AM Lab Session 7: **Imaging of iPSC, differentiated cells and organoids**  
Instructors: Bana Abolibdeh, Colin O'Hern and Aitor Aguirre  
Location: Bioeconomy Institute

10:45 AM **Coffee Break**  
Location: Bioeconomy Institute

11:00 AM **Wrap up and final questions**  
Location: Bioeconomy Institute

12:00 - 2:00 PM

**Lunch & Tech Innovation Showcase / Vendor Show**

Location: Haworth Conference Center

**Check-out and return borrowed laptop if necessary**