IMPORTANT: This syllabus form should be submitted to OAA (gsbs_academic_affairs@uth.tmc.edu) a week before the start of each semester.

NOTE to STUDENTS: If you need any accommodations related to attending/enrolling in this course, please contact one of the Graduate School's 504 Coordinators, Cheryl Spitzenberger or Natalie Sirisaengtaksin. We ask that you notify GSBS in advance (preferably at least 3 days before the start of the semester) so we can make appropriate arrangements.

Term and Year: **Spring 2027** Course Number and Course Title: **GS04 1051: Fluorescence and Electron Microscopy: Imaging Cells and Molecules** **Credit Hour: 1** **Prerequisites:** General knowledge of microbiology and biochemistry and consent of instructor (approval code needed for registration). Meeting Location: **McGovern Medical School** **Building/Room#: MSB 1.180** **WebEx/Zoom Link: N/A**	**Program Required Course:** No **Approval Code:** Yes **(If yes,** the Course Director or the Course Designee will provide the approval code.) **Audit Permitted:** Yes **Classes Begin:** Jan. 25, 2027 **Classes End:** April 5, 2027 **Final Exam Week:** April 12, 2027

Class Meeting Schedule

Day	Time
Monday	**1-2pm (Lectures), 2-4pm (Labs)**

Course Director Name and Degree: **Bo Hu, Ph.D.** Title: Associate Professor Department: Microbiology & Mol. Genetics Institution: UTH Email Address: Bo.H@uth.tmc.edu Contact Number: 713-500-5434 **Course Co-Director/s:** (if any) Name and Degree: **William Margolin, Ph.D.**	**Instructors** 1. **William Margolin,** *Ph.D.* Institution: UTH Email Address : William.Margolin@uth.tmc.edu 2. **Kevin Morano, Ph.D.** Institution: UTH Email Address : Kevin.A.Morano@uth.tmc.edu 3. **Irina I. Serysheva, Ph.D.** Institution: UTH Email Address: Irina.I.Serysheva@uth.tmc.edu

Title: Professor

Department: Microbiology & Mol. Genetics

Institution: UTH

Email Address: William.Margolin@uth.tmc.edu

NOTE: Office hours are available by request. Please email me to arrange a time to meet.

4. **Kuang-Lei Tsai, Ph.D.**

   Institution: UTH

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5. **Travis I. Moore, Ph.D.**

   Institution: UTH

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6. **Heidi B. Kaplan, Ph.D.**

   Institution: UTH

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7. **Todd Cameron, Ph.D.**

   Institution: UTH

   Email Address: todd.cameron@uth.tmc.edu

Course Description:
The Fluorescence and Electron Microscopy course consists of lectures and labs on Monday afternoons during the Spring semester. The most important and valuable feature of this course is that it provides hands-on experience with fluorescence microscopy as well as transmission electron microscopy and cryo-EM, taught by experts in the various specialties.

Textbook/Supplemental Reading Materials (if any)

- **none**

Course Objective/s:
See below.

***Specific Learning Objectives*:**

1. **Learn about the optical principles underlying light microscopy and basic microscope hardware employed for this type of imaging.**

2. **Understand the basis of cutting-edge fluorescence microscopy methods for imaging of cells and subcellular organelles, with an emphasis on microbial cells.**

3. **Learn how to acquire, process and analyze images of cells and subcellular localization patterns obtained from light and fluorescence microscopy.**

4. **Understand the principles and basics of electron microscopy, and learn about sample preparation and operation of an electron microscope.**

5. **Understand the basis of cryo-electron microscopy, and learn about cryo sample preparation and basics of 3D reconstruction from 2D tilt serials.**

Student Responsibilities and Expectations:

Students enrolled in this course will be expected to perform the following activities each week.

1. Read and review (study) assigned reading material (reviews and research literature) prior to class.
2. Attend and participate at the lab session.
3. Participate in and contribute to course discussions during lecture.
4. Prepare for homework based on lecture and lab practice.

Students are expected to complete all assigned reading material (reviews and research literature) prior to class. While you may work and discuss all course materials and assignments in groups, all writing assignments must be your own. Plagiarism and failure to properly cite scientific literature and other sources will not be tolerated and are grounds for dismissal from the course and further GSBS disciplinary action. Cheating or engaging in unethical behavior during examinations (quizzes and final) will be grounds for dismissal from the course without credit and further GSBS disciplinary action.

Grading System: **Pass/Fail**

Student Assessment and Grading Criteria : *(May include the following:)*

Percentage	Description
Homework (30%)	Students will write Materials & Methods and Results Sections accompanied with a publishable multi-panel figure and a figure legend corresponding to data obtained from each section, i.e. fluorescence microscopy (Margolin, Cameron, Kaplan) for Assignment 1, electron microcopy (Tsai) for Assignment 2, and cryo-EM (Hu and Serysheva) for Assignment 3.
Participation / Attendance (70%)	attendance (20%), lab participation (50%)

CLASS SCHEDULE - Spring 2027

Date	Duration (Hour(s) taught by lecturer)	Lecture Topic	Lecturer/s
1/25/2027	1	Lecture: Principles of Light Microscopy	Morano
2/01/27	3	Lecture: Hardware and Equipment Lab: Preparation of samples, fluorescence microscopy	Morano/Cameron
2/08/27	3	Lecture: Whole Cell Imaging Lab: More Fluorescence Microscopy and Confocal Microscopy	Margolin/ Kaplan
2/15/27	3	Lecture: Image Post-Processing Lab: Image Processing and Analysis	Moore/ Cameron
2/22/27	3	Lecture: Advanced Fluorescence Microscopy Technologies Lab: Super-Resolution and TIRF Fluorescence Microscopy	Moore
3/01/27	3	Lecture: Introduction to Electron Microscopy Lab: Sample preparation and negative staining	Tsai
3/08/27	3	Lecture: TEM – Operation and Data Collection Lab: TEM – Operation and Data Collection	Tsai
3/22/27	3	Lecture: Electron Cryomicroscopy Lab: Specimen preparation for cryo-EM	Serysheva
3/29/27	3	Lecture: Cryo-electron microscopy Lab: Cryo-EM – Operation and Data Collection	Hu
4/05/27	3	Lecture: Cryo-EM – Image Processing Lab: Cryo-EM – Image Processing	Hu

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