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: **Fall 2024** Course Number and Course Title: **GS04 1093: The Biology of Cancer Metastasis** Credit Hours: **3 hours** Prerequisites (if any): **None** Meeting Location: **UTHH-MDACC** Building/Room#: **BSRB S3.8371 (GSBS Large Classroom)**	**Program Required Course:** No **Approval Code:** No **(If yes,** the Course Director or the Course Designee will provide the approval code.) **Audit Permitted:** Yes **Classes Begin:** Thursday, August 29, 2024 **Classes End:** Thursday, December 5, 2024 **Final Exam Week: December 9-13, 2024**

Class Meeting Schedule

Day	Time
T/Th	**3:45-5:15pm**

Course Director Name and Degree: **Daniel Frigo, PhD** Title: Professor and Deputy Chair Department: Cancer Systems Imaging Institution: MDACC Email Address: frigo@mdanderson.org Contact Number: 713-563-9673 **Course Co-Director/s:** (if any) Name and Degree: **Wenliang Li, PhD** Title: Professor Department: Institute of Molecular Medicine Institution: UTHH Email Address: Wenliang.Li@uth.tmc.edu Contact Number: 713-500-3363	**Instructor/s** 1. **Daniel Frigo, PhD** Institution: MDACC Email Address: frigo@mdanderson.org 2. **Anirban Maitra, MD, PhD** Institution: MDACC Email Address: AMaitra@mdanderson.org 3. **Guocan Wang, PhD** Institution: MDACC Email Address: GWang6@mdanderson.org 4. **Guillermina Lozano, PhD** Institution: MDACC Email Address: gglozano@mdanderson.org

NOTE: Office hours are available by request. Please email me to arrange a time to meet. **Teaching Assistant**: (if any) None N.A Name and Email Address	5**. Junchen Liu, PhD** Institution: UTHealth Email Address: Junchen.Liu@uth.tmc.edu 6. **Nicholas Navin, PhD** Institution: MDACC Email Address: nnavin@mdanderson.org 7. **Wenliang Li, PhD** Institution: UTHealth Email Address: Wenliang.Li@uth.tmc.edu 8. **Dihua Yu, PhD** Institution: MDACC Email Address: dyu@mdanderson.org 9. **Xi Chen, PhD** Institution: MDACC Email Address: XChen23@mdanderson.org 10**. Di Zhao, PhD** Institution: MDACC Email Address: DZhao2@mdanderson.org 11. **Loukia Karacosta, PhD** Institution: MDACC Email Address: LGKaracosta@mdanderson.org 12. **Eleonora Dondossola, PhD** Institution: MDACC Email Address: EDondossola@mdanderson.org

	13. **James Allison, PhD** Institution: MDACC Email Address: JAllison@mdanderson.org 14**. Shabnam Shalapour, PhD** Institution: MDACC Email Address: SShalapour@mdanderson.org 15. **Ronald DePinho, MD** Institution: MDACC Email Address: RDePinho@mdanderson.org 16. **George Calin, PhD** Institution: MDACC Email Address: gcalin@mdanderson.org 17**. Jeffrey Rosen, PhD** Institution: BCM Email Address: jrosen@bcm.edu 18. **David Piwnica-Worms, MD, PhD** Institution: MDACC Email Address: dpiwnica-worms@mdanderson.org 19. **Li Ma, PhD** Institution: MDACC Email Address: LMa4@mdanderson.org 20. Name and Degree: John Hagan, PhD Institution: UTHealth Email Address: John.P.Hagan@uth.tmc.edu

	21. **Anthony Lucci, MD** Institution: MDACC Email Address: ALucci@mdanderson.org 22. **John Heymach, MD, PhD** Institution: MDACC Email Address: jheymach@mdanderson.org 23. **Florencia McAllister, MD** Institution: MDACC Email Address: FMcAllister@mdanderson.org

Course Description:
A didactic introductory level course entirely dedicated to the study of the cellular biological processes that underpin cancer metastasis. This course will cover basic, translational, and clinical knowledge, with specific emphases on the metastatic cascade: seed and soil hypothesis, organ-specific metastasis, cell cycle and metastasis, multiple therapies for various metastatic cancers, and will address the process of taking basic research to the clinic ('bench-to-bedside') for major metastatic human cancers.

This is a prerequisite course for cancer biology students in the cancer discovery track.

Textbook/Supplemental Reading Materials (if any)

- Original research articles assigned by faculty instructors.

Course Objective/s:
Dissect the mechanisms controlling cancer progression from the primary tumor site into the circulation and seeding distant organs.

At the conclusion of this course, students should have an understanding of: 1) how malignant tumors begin, 2) preclinical methods used to study metastasis, 3) how the disease evolves genetically, epigenetically, and metabolically, 4) how disseminated cancer cells can go undetected, 5) the roles of host-modifyable factors and the immune system in metastasis, and 6) how metastastic cancers are being monitored and targeted in the clinic.

This course is also dedicated to improving trainees' skills in critical reading, writing, and presenting cancer research.

***Specific Learning Objectives*:**

1. To understand the steps in metastasis development and the role of tumor heterogeneity in the metastasis process.
2. To understand the role of the tumor microenvironment in promoting metastasis.
3. To understand cell cycle and metastasis.
4. To understand the molecular mechanisms of migration and invasion and angiogenesis as they relate to circulating tumor cells and disseminated tumor cells and their roles in metastasis.
5. To understand current treatment of metastasis - Conventional therapies and lessons from genomic sequencing.

Student Responsibilities and Expectations: This course is designed to help students build a knowledge base that allows them to develop their scientific analytical and communication skills. Students will be evaluated on the basis of a basic concept tests (60% total: 20%/test (3 exams)), a group presentation/student seminar (20%) and overall participation (20%).

Grading System**: Letter Grade (A-F)**

Student Assessment and Grading Criteria:

Percentage	Description
Presentation (20 %)	Students will team together (~2 students/group) to present on a pre-selected paper. Presentations will include the background/rationale for the study, hypothesis, approach, conclusions and overall strengths and weaknesses of the study as well as perceived overall impact. The leading faculty and 1-2 additional students scheduled for each student seminar will lead the follow-up discussion.
Exams (60%)	Students will be tested on the principles of metastasis. These will be take home tests based on material from the lecturers and any assigned readings.
Participation and/or Attendance (20%)	For student seminars (the journal club), the non-presenting students should also read the paper and come prepared. Students may be called upon at random to discuss the hypothesis, the strategy used to examine this hypothesis, the experiments described in each figure, and the conclusion. In addition, attendance to lectures and interactions with the lecturers will also be taken into consideration.

Scale: 100-92% A; 91.9-90% A-; 89.9-87% B+; 86.9-82% B; 81.9-80% B-; 79.9-77% C+; 76.9-72% C; 71.9-70% C-; 69.9-67% D+; 66.9-62% D; 61.9-60% D-; < 60% F

CLASS SCHEDULE

Date	Duration (Hour(s) taught by lecturer)	Lecture Topic	Lecturer/s
Thursday, August 29	**1.5**	Introduction to Metastasis	Dr. Daniel Frigo
Tuesday, September 3	**1.5**	The Pathology of Metastasis	Dr. Anirban Maitra
Thursday, September 5	**1.5**	Mouse Models of Metastasis	Dr. Guocan Wang
Tuesday, September 10	**1.5**	Genetics of Metastasis	Dr. Guillermina Lozano
Thursday, September 12		Class Cancelled	
Tuesday, September 17	**1.5**	Student Seminars	Dr. Junchen Liu
Thursday, September 19		NO CLASS	
Tuesday, September 24	**1.5**	Tumor Evolution and Metastasis	Dr. Nicholas Navin
Thursday, September 26	**1.5**	Student Seminars	Dr. Wenliang Li
		FIRST EXAM EMAILED: DUE BY OCT 4, 2024, 10 AM	
Tuesday, October 1	**1.5**	The Metastatic Niche	Dr. Dihua Yu
Thursday, October 3	**1.5**	Role of Immune Cells in Metastasis	Dr. Xi Chen
Tuesday, October 8	**1.5**	Student Seminars	Dr. Di Zhao
Thursday, October 10		NO CLASS	
Tuesday, October 15	**1.5**	Epithelial-Mesenchymal Transition	Dr. Loukia Karacosta
Thursday, October 17	**1.5**	Student Seminars	Dr. Eleonora Dondossola
Tuesday, October 22	**1.5**	Immunotherapy	Dr. James Allison
Thursday, October 24	**1.5**	Student Seminars	Dr. Shabnam Shalapour
Tuesday, October 29	**1.5**	Waterfall chat on metastasis research: What's next?	Dr. Ronald DePinho
Thursday, October 31	**1.5**	lncRNAs and Metastasis	Dr. George Calin
Tuesday, November 5	**1.5**	Cancer Metastasis Metabolism	Dr. Daniel Frigo
		SECOND EXAM EMAILED: DUE BY NOV 15, 2024, 10 AM	

Thursday, November 7	**1.5**	Minimal Residual Disease & Dormancy	Dr. Jeff Rosen
Tuesday, November 12	**1.5**	Imaging of Cancer Metastasis	Dr. David Piwnica-Worms
Thursday, November 14		NO CLASS	
Tuesday, November 19	**1.5**	miRNAs and Metastasis	Dr. Li Ma
Thursday, November 21	**1.5**	Student Seminars	Dr. John Hagan
Tuesday, November 26	**1.5**	CTCs and ctDNA in cancer prognosis and treatment	Dr. Anthony Lucci
Thursday, November 28		NO CLASS -- THANKSGIVING	
Tuesday, December 3	**1.5**	Treatment Options for Metastasis	Dr. John Heymach
Thursday, December 5	**1.5**	Role of the Microbiome in Metastasis	Dr. Florencia McAllister
		FINAL EXAM EMAILED: DUE BY DECEMBER 10, 2024, 10 AM	

DF-JAL/ WC