Term and Year: **Fall 2024**

Course Number and Course Title:
GS14 1183: Biology of Neurological Diseases

Credit Hours: 3

Meeting Location: **UT MDACC**

Building/Room#: **BSRB S3.8112
                        (GSBS Computer Lab)**

WebEx/Zoom Link:
https://mdacc.zoom.us/j/86893866500?pwd=WjdtZW ZrOWt1d2d6enpQaFRTYkFCdz09
Meeting ID: **868 9386 6500**
Password: **232610**

Program Required Course: **No**

Approval Code: **No**

Audit Permitted: **Yes**

Classes Begin: **August 26, 2024**

Classes End: **December 13, 2024**

Final Exam Week: **No final exam**

Class Meeting Schedule

Day	Time
Tuesday (Lecture)	**1:00-3:00 PM**
Thursday (Review & JC Discussion)	**1:00-2:30 PM**

Course Director

Name and Degree: **Sheng Zhang, PhD**

Title: Associate Professor

Department: I**MM & NBA**

Institution: ***UTH***

Email Address: Sheng.Zhang@uth.tmc.edu

Contact Number: (713) 500-3493

Course Co-Director/s:

Name and Degree: **Jian Hu, PhD**

Title: Professor

Department: Cancer Biology

Institution: *MDACC*

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Instructor/s

1. **Sheng Zhang, PhD**
    Associate Professor
    Institute of Molecular Medicine
    Department of Neurobiology and Anatomy
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2. **Jian Hu, PhD**
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    The University of Texas MD Anderson Cancer Center
    jhu3@mdanderson.org

3. **Wei Cao, PhD**
    Professor, Center for Perioperative Medicine
    Department of Anesthesiology
    UTHealth Houston| McGovern Medical School

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

Teaching Assistant:

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4. **Andrey Tsvetkov, PhD**
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5. **Consuelo (Chelo) Walss-Bass, PhD**
   Professor and John S. Dunn Foundation Distinguished Chair in the
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6. **Myriam Fornage, PhD, FAHA**
   Professor of Molecular Medicine and Human Genetics
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7. **Edgar T. Walters, PhD**
   Professor of Integrative Biology and Pharmacology
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8. **Rodrigo F. Morales, PhD**
   Professor
   Mitchell Center For Alzheimer's Disease & Brain Disorders
   Department of Neurology
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9. **Kartik Venkatachalam, PhD**
   Professor
   Department of Integrative Biology and Pharmacology
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Course Description:
This course will focus on the etiologies underlying major neural diseases. Led by GSBS faculty with related expertise, the course will review representative neural diseases and discuss seminal research papers in the respective fields, with emphasis on the current understanding of these diseases at molecular, cellular, and system levels. By completing this course, students should grasp the knowledge of the fundamental biology of major neural diseases, appreciate the common and distinctive mechanisms underlying these diseases, learn the existing hypotheses and experimental paradigms as well as outstanding questions and main challenges in the field, and hone the ability to develop novel strategies for scientific and translational discoveries for this unique group of diseases.

Textbook/Supplemental Reading Materials (if any)

- No textbook

- List of reading materials will be provided weekly by lecturing instructors

Course Objective/s:

Upon successful completion of this course, students will have a broad understanding of the basic biology, existing hypotheses, experimental paradigms and major challenges related to major neural diseases, and learn to develop new hypotheses and strategies to tackle these unique diseases.

Specific Learning Objectives:

1. Learn the basics of neuropathology of major neural diseases,.nderstand the shared and distinct pathologic and molecular features associated with the diseases
2. Gain knowledge on the genetic, molecular and cellular basis of major neural diseases, understand the existing hypotheses and major controversies regarding the molecular and cellular mechanisms of these diseases.
3. Learn the methods and model systems used to study these diseases, their strength, and shortcomings.
4. Distill scientific literature into key elements and findings, identify shortcomings and propose future directions.
5. Apply the knowledge learned to develop new hypotheses and experiments to test them.

Student responsibilities and expectations:

Enrolled students are expected to complete the following activities:

1. Read 1-2 review papers relating to the week's topics assigned by the lecturers
2. Read 1-2 primary research articles assigned by the week's lecturer
3. Write one 1-2 page literature synopses for one of the assigned research articles (see Course Grading for more detail)
4. Present and lead a discussion on research papers in the weekly review and journal club (JC) session
5. Participate in and contribute to course discussions during lecture and JC review sessions

Students are expected to complete all assigned reading material (reviews and research papers) prior to class. You are encouraged to work and discuss all course materials and assignments in groups, but all writing assignments must be your own.

Grading System: Letter Grade (A-F)

Student Assessment and Grading Criteria: A total of 520 points is available during the course. Grade (A-F) based on % of points you earned) will be determined by the following items.

Percentage	Description
Literature Synopses (~80%) (30 points/synopses, 420 points total)	For each week's lecture, students will be assigned 1 review paper and 1-2 primary research papers to read critically. Students will choose one of the assigned papers to write a one-page synopsis that (1) describe the questions, method/experimental design and key findings; (2) identify potential shortcomings in the paper or new questions arising from the paper, and suggest some follow-up studies to address them. The students will have one week to complete each synopses.
Lecture Attendance and Participation (~5 %) (2 point/lecture, 28 points total)	Students are encouraged to be physically present for lecture. Students are encouraged to ask questions and engage in discussion with classmates and instructors during lecture, and to submit written questions or discussion points after class.
Review/JC Attendance and Participation (~5 %) (2 point/JC session, 28 points total)	Students are expected to be physically present and actively engaged in JC discussion.
JC presentation (~8% and higher) (22 point/JC presentation, 44 points total expected, but 10 bonus points can be earned/as leader of each additional JC session).	Students are expected to sign up to lead at least two of the JC sessions during the semester together with the leading faculties of the week. Multiple students can join together to lead each JC session.

CLASS SCHEDULE - Biology of Neurological Diseases -Fall 2024

Week	Date Tuesday 1-3:00pm Thursday 1-2pm	Duration (Hours taught by Lecturer)	Lecture Topic	Instructors
1	**August 27, 2024**	**2**	**1. Course introduction 2. Overview of neural diseases**	**Sheng Zhang, Ph.D. Jian Hu, Ph.D.**
	August 29, 2024	**1.5**	Review/JC	Sheng Zhang, Ph.D.
2	**September 3, 2024**	**2**	**Alzheimer's disease**	**Dr. Wei Cao**
	September 5, 2024	**1.5**	Review/JC	Wei Cao, PhD
3	**September 10, 2024**	**2**	**Prion diseases**	**Rodrigo F. Morales, PhD**
	September 12, 2024	**1.5**	Review/JC	Rodrigo F. Morales, PhD
4	**September 17, 2024**	**2**	**Parkinson's diease-1: PD review and Dopmaine pathways in PD etiology**	**Sheng Zhang, PhD**
	September 19, 2024	**1.5**	Review/JC	Sheng Zhang, PhD
5	**September 24, 2024**	**2**	**Parkinson's diease-2: mitochondria health and membrane dynamics in PD etiology**	**Sheng Zhang, PhD**
	September 26, 2024	**1.5**	Review/JC	Sheng Zhang, PhD
6	**October 1, 2024**	**2**	**Lysosomal storage diseases**	**Kartik Venkatachalam, PhD**

	October 3, 2024	1.5	Review/JC	Kartik Venkatachalam, PhD
7	**October 8, 2024**	**2**	**Mental Health Disorders**	**Consuelo Walss-Bass, PhD**
	October 10, 2024	**1.5**	Review/JC	Consuelo Walss-Bass, PhD
8	**October 15, 2024**	**2**	**Tau and tauopathy**	**Sheng Zhang, PhD**
	October 17, 2024	**1.5**	Review/JC	Sheng Zhang, PhD
9	**October 22, 2024**	**2**	**Nucleotide repeat diseases and Polyglutamine diseases**	**Andrey Tsvetkov, PhD**
	October 24, 2024	**1.5**	Review/JC	**Andrey Tsvetkov, PhD**
10	**October 29, 2024**	**2**	**Multiple sclerosis & Demyelinating dieases**	**Jian Hu, PhD**
	October 31, 2024	**1.5**	Review/JC	Jian Hu, Ph.D
11	**November 5, 2024**	**2**	**Brain Tumors**	**Jian Hu, PhD**
	November 7, 2024	**1.5**	Review/JC	Jian Hu, PhD
12	**November 12, 2024**	**2**	**Stroke and Related Diseases**	**Myriam Fornage, PhD**
	November 14, 2024	**1.5**	Review/JC	Myriam Fornage
13	**November 19, 2024**	**2**	**Amyotrophic lateral sclerosis (ALS) and other Motor neuron diseases (MNDs)**	**Sheng Zhang, PhD**

	November 21, 2024	**1.5**	Review/JC	Sheng Zhang, PhD
	11/25-29/2024	**Thanksgiving week, no class**		
14	**December 3, 2024**	**2**	**Neuropathic pain**	**Edgar T. Walters, Ph.D.**
	December 5, 2024	**1.5**	Review/JC	Edgar T. Walters, PhD
15	**December 09-13, 2024**	**End of class, last class works due by the end of the week. Individual Q/A sessions with instructors by advanced appointments are welcome.**		

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