



Office for Research
Long School of Medicine

LSOM Dean's Office for Research Advanced Basic Science Technical Training

Course Director:

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Length of Course:

Fall Semester: August– November

Prerequisites & Eligibility:

- Course is available for 1st and 2nd year LSOM medical students

Learning Objectives

After completion of this course, learners will be able to:

- Develop a working knowledge of basic science techniques
- Gain firsthand technical training of essential basic science methodologies

Description

The next generation of physician leaders will interface at the frontline of clinical care and basic science research. Clinical care requires mechanistic knowledge of underlying disease progression to evaluate treatments. Physicians with a developed statistical background and Institutional Review Board experience can more readily lead clinical trials. Either as a co-investigator in a basic science grant or leading a clinical care unit, physicians with advanced basic science knowledge are called to lead in the medical community. To support the next generation of physician leaders, research training during medical school is critical for successful research opportunity achievements. The LSOM Dean's Office for Research has developed an elective to provide interested students with a practical basic science foundation that will further enable their contributions to research opportunities across campus. Through our elective, medical students will develop technical communication and critical thinking skills, which qualities are essential for the next generation of physician leaders.

Elective Goals:

Goal 1: Increase core technical knowledge in medical students

Provide medical students with a didactic lecture series that systematically unravels the technical details behind foundational basic science methodologies. To capitalize on this aim, the lectures will be led by peer colleagues such as senior graduate students and post-doctoral fellows. This approach not only provides an opportunity for peer-to-peer technical training but introduces novel teaching opportunity for the graduate and medical student community. Upon reviewing medical student research opportunities, we have selected techniques that are essential to research experiences on the LSOM campus.

Goal 2: Prepare medical students for research opportunities with hands-on technical training

Participate in an accelerated hands-on technical training workshop to increase the technical skillset of medical students before they engage in research opportunities. This will allow medical students to enter a laboratory with technical knowledge and execution capability that they would otherwise need to develop at the beginning of the research project. We invite senior graduate students and post-doctoral fellows to complete a live demo of a research technique. The hands-on training will complement the didactic lectures from Goal 1.

Requirements:

- 1-hour didactic lectures twice per month
- Participation in a hands-on technical workshop twice a month
 - Each workshop session will be 3-4 hours

Course Deliverables:

- Complete a pre-and post-course self-evaluation of technical knowledge and skillset
- Write a technical protocol for each method module
- Presentation of a project overview

Course Faculty

- Senior Graduate students and Post-Doctoral Fellows
 - Instructors provided peer-to-peer teaching, which introduces a team-based training paradigm between medical, graduate students, and post-doctoral fellows. This approach will seed technical communication skills that are invaluable for future physicians and scientists.
- Faculty will oversee student instructor leaders and provide guidance
 - Kate Lathrop, MD- Associate Dean for Medical Student Research
 - Manzoor Bhat, PhD- Interim Vice Dean of Research and Department of Physiology Chair
 - Patrick Sung, PhD- Associate Dean of Research and Director of the Greeyhey Children's Cancer Research Institute
 - Chris Valdez, PhD- Research Operations Manager in the Office for Research

Course Schedule:

The elective will be available for a class size up to 20 students. The class will be separated into two groups (Group 1 & Group 2). Each group will meet twice a month from August to the first week of October with a Friday afternoon lecture and a Saturday morning hands-on technical training session. The Saturday morning training sessions are scheduled to begin at 9:30am and last 3-4 hours. In mid-October, the hands-on Saturday training sessions will end, and the course will consist of only Friday afternoon lectures on data analysis collected from the course, presentation workshops, and a group presentation on November 3, 2023. The course dates are scheduled to change if requirements and other external factors deem necessary.

Date	Group	Description
August 4th-5th	Group 1	Western Blotting 101: Gel preparation, immunoblot transfer, antibody staining, and densitometry
August 11 th -12 th	Group 2	Western Blotting 101: Gel preparation, immunoblot transfer, antibody staining, and densitometry
August 18 th -19 th	Group 1	DNA Amplification: PCR, primer selection and gel electrophoresis
August 25 th -26 th	Group 2	DNA Amplification: PCR, primer selection and gel electrophoresis
Sept 1st-2nd	Group 1	Immunocytochemistry: Cell fixation, and antibody staining
Sept 8 th & 9 th	Group 2	Immunocytochemistry: Cell fixation, and antibody staining
Sept 15 th & 16 th	Group 1	Fluorescence microscopy I: Capture images from the ICC and IHC-prepared samples
Sept 22nd & 23rd	Group 2	Fluorescence microscopy I: Capture images from the ICC and IHC-prepared samples
Sept 29 th & 30 th	Group 1	Clinical and Basic Science Learning Exchange
Oct 6 th & 7 th	Group 2	Clinical and Basic Science Learning Exchange
Oct 13 th	Group 1&2	Data Analysis I
Oct 20 th	Group 1&2	Data Analysis I
Oct 27 th	Group 1&2	How to give a scientific presentation during a lab meeting
Nov 3 rd	Group 1&2	Group Presentations