

# Program Curriculum

## Courses

### Fall – First year

Biochemistry for Biomedical Sciences

Biological Microscopic Imaging I

Molecular Imaging Methods of Biomedical Research I

Biomedical Science Interdisciplinary Laboratory I

Ethics in Biomedical Research

Total Fall Semester 1

### Spring – First Year

Biological Microscopic Imaging II

Molecular Imaging Methods of Biomedical Research II

Elective 1

Seminar in Biomedical Science

Total Spring Semester 1

### Summer

Internship in Industry or Research Laboratory

Summer Semester

### Fall - Second Year

Special Topics Microscopic Anatomy

Introduction to Biostatistics

Human Cell and Molecular Biology for Biomedical Sciences

Company or lab preceptorship

Thesis Preparation

Total Fall Semester 2

Total Credits : 39

### Example Electives

Fundamental Neuroscience I

Tissue Engineering

Anatomy and Physiology for Biomedical Engineers

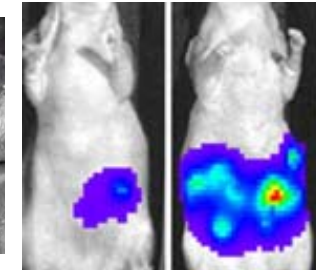
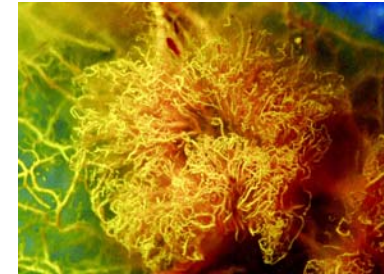
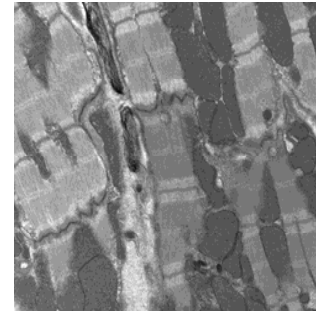
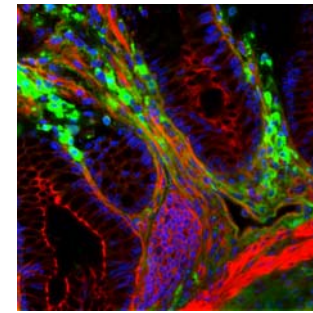
Developmental Biology

Histology

Hallmarks of Cancer

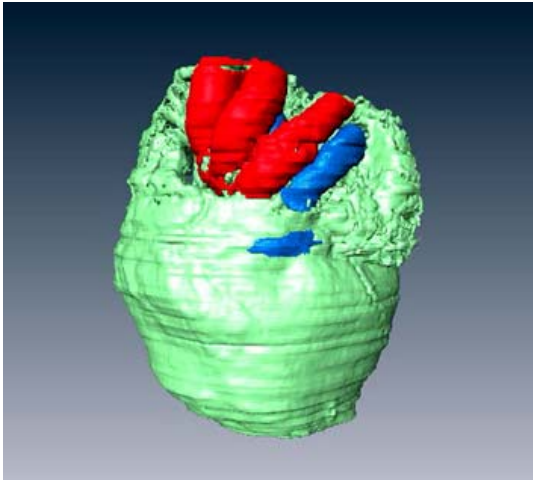
## Representative equipment students will be trained on:

- JEOL JEM-1400+ Transmission Electron Microscope
- JEOL 6300V Scanning Electron Microscope
- Leica SP8 Multiphoton Confocal Microscope
- Zeiss LSM 510 META Confocal Microscope
- Zeiss VivaTome Spinning Disk Confocal Live Cell Imaging System
- Beckman Coulter FC500 Flow Cytometer
- BD FACS Aria II Cell Sorter
- BioRad BioPlex System
- LiCor Odyssey CLX System
- BioRad CFX Connect rtPCR system
- Visual Soniics VEVO 770 High Resolution In Vivo Imaging System
- IVIS Spectrum Fluorescence and Bioluminescence Imaging System
- Mauna Kea Cellvizio Confocal Laser Endomicroscope
- Histology Microtomes, Cyrostats and Vibratome
- Dako ACIS Imaging System
- Nikon E600 Widefield Epifluorescence and Dark-field Microscope
- AMIRA 3D Reconstruction Software
- Image Pro Plus & Photoshop Software



UNIVERSITY OF  
SOUTH CAROLINA

Applied Biotechnology  
Concentration  
in the M.S. in  
Biomedical Science  
Program



## Applied Biotechnology

The biotechnology industry is rapidly growing nationwide and in South Carolina. The US Bureau of Labor Statistics predicts nationwide growth in biotechnology positions of 14% between 2010 and 2020, including growth in fields requiring advanced training in wet laboratories that require biochemists and biophysicists, microbiologists, and medical scientists.

## Our Goal

The goal of the Applied Biotechnology Concentration is to provide “hands-on training” on a range of techniques and instrumentation currently used in basic research in pharmaceutical laboratories, biotech companies, and biomedical research laboratories.

## The Program

The program consists of 39 credits taken over a 16 month period of study and includes 4 “hands-on” courses in which students learn to prepare samples and operate a wide range of equipment for the analysis of RNA and DNA, confocal and electron microscopes, cell sorters, and small animal imagers.

An important component of the program is an internship in a biomedical research laboratory or biotech company where students will be able to participate in programs studying inflammation, cancer, cardiovascular and neurological diseases, and drug development. Students in the M.S. in Biomedical Science Applied Biotechnology Concentration will be required to successfully complete either a research or library based thesis.



Students learn specimen preparation for confocal microscopy.



The Instrumentation Resource Facility (IRF) is an integral component of the research and teaching mission of the University of South Carolina School of Medicine (USC SOM). Located within the facility are several major pieces of state-of-the-art biomedical research equipment that provide techniques ranging from whole animal through single cell imaging to analysis at the molecular level. The IRF also houses a full range of ancillary equipment that is available for sample preparation. In addition to serving as a resource for acquisition of primary data, the IRF also has the capacity for image enhancement and related data analysis.

## Contact Us

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Visit us on the web: [http://  
irf.med.sc.edu/](http://irf.med.sc.edu/)