Orthopaedic Implant & Imaging Laboratory
Our laboratory is dedicated to exploring the scientific basis of musculoskeletal diseases and injuries and to developing new technologies for the improvement of musculoskeletal function. The laboratory is directed by Dr. Weiping Ren. Located in a recently constructed wet lab within the Bioengineering Center, this laboratory contains equipments dedicated for use in orthopaedic tissue engineering and imaging studies. This includes facilities available for the preparation and characterization of both bone and soft tissue scaffolds for tissue engineering and targeted drug delivery device development.

Detroit Medical Center/Providence Hospital Orthopaedic Research Laboratory
Built in 2008, this lab was developed to support residents' education and academics through research. The lab consists of over 1000 square feet of space within the existing 12,000 square feet area of hospital patient care research center. Four PhD scientists are recruited to provide research support for teaching faculty and resident research. In addition to the resources of the patient care research laboratory, the Orthopaedic Research laboratory now includes resources for in vivo micro computed tomography, flow cytometry and real time-polymerase chain reaction quantification of gene expression. A large animal facility is on site for use (for mice, rat, rabbit, pig, sheep and dogs).

The laboratory focuses on the following research areas: biomaterial compatibility, molecular mechanisms of implant loosening, and molecular imaging of orthopaedic diseases. Strong interdepartmental collaborations with the Wayne State University College of Engineering and Providence Hospital provide an exceptional environment for intellectual development.

Research

Orthopaedic Device technologies
Preparation and characterization of bone and soft tissue scaffolds for orthopaedic tissue engineering implant coating with nanoceramic matrix for controlled drug release

Molecular and Cellular Imaging
PET/CT Imaging of Periprosthetic Inflammation and Osteointegration
Dendrimer-Based Nanoprobe for Macrophage-Specific Imaging

Targeted Drug Delivery
Nano Particle-Mediated Controlled Drug Release in Orthopedic Diseases
Macrophage-targeted drug delivery via folate receptors

Biocompatibility
Impact of titanium prosthesis surface modification on tissue biocompatibility
Composite of polymetric, metallic and ceramic materials with drug loading

Interested Area:
Orthopaedic biomechanics
Orthopedic trauma
Data images:

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**Equipment**

The lab is equipped with four foot Baker tissue culture hoods, Forma tissue culture incubators, Molecular Devices UVmax microplate spectrophotometer, freezers (-20°C and -80°C), refrigerators, nitrogen freezer, Nunc ELISA wash system, Biorad disc, slab, and minigel electrophoresis systems, a hybridization oven, MMC Amicon filtration unit, Sorvall benchtop refrigerated centrifuge, Beckman Model 24 spectrophotometer, Polytron PT2100, Virtis lyophilizer, Leitz inverted tissue culture microscope, Mettler and Sartorius balances, and an autoclave machine.

Additional molecular imaging equipment includes a Zeiss Axio Observer fluorescence/phase contrast microscope work station, an IBM compatible Pentium computer which is maintained in the lab controlling the microscope digital camera, and a GE eXplore RS80 MicroCT system located in the animal facility.

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**RESEARCH PERSONNEL**

**Weiping Ren, M.D., Ph.D.**  
Director, Orthopaedic Research Lab

**Tong Shi, M.S.**  
Laboratory Manager

**Ph.D. Students**

Song Wei, M.S.  
Mahmoud A. Fardous, M.S.  
Liang Chen, M.S.

**Undergraduate student**

Aliya Jawad

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**For additional information please contact:**

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