Fiscal Year:	FY 2013	**Task Last Updated:**	FY 10/23/2012
PI Name:	Lau, Anthony G Ph.D.		
Project Title:	Whole Joint Health: Investigating Modeled Spaceflight Changes in Mice		
Division Name:	Human Research		
Program/Discipline:	NSBRI		
Program/Discipline--Element/Subdiscipline:	NSBRI--Musculoskeletal Alterations Team		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **HHC**:Human Health Countermeasures		
Human Research Program Risks:	(1) **Bone Fracture**:Risk of Bone Fracture due to Spaceflight-induced Changes to Bone		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	08618-1104	**Congressional District:**	12
Comments:	NOTE: As of Fall 2015, Dr. Lau is at The College of New Jersey. Previously at University of North Carolina at Chapel Hill while NSBRI postdoc.		
Project Type:	GROUND	**Solicitation / Funding Source:**	2012 NSBRI-RFA-12-02 Postdoctoral Fellowships
Start Date:	11/01/2012	**End Date:**	10/31/2014
No. of Post Docs:	1	**No. of PhD Degrees:**	
No. of PhD Candidates:		**No. of Master' Degrees:**	
No. of Master's Candidates:		**No. of Bachelor's Degrees:**	
No. of Bachelor's Candidates:		**Monitoring Center:**	NSBRI
Contact Monitor:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Bateman, Ted (MENTOR/ University of North Carolina)		
Grant/Contract No.:	NCC 9-58-PF03003		
Performance Goal No.:			
Performance Goal Text:			
	POSTDOCTORAL FELLOWSHIP During extended spaceflight missions, astronauts are exposed to a microgravity environment. The disuse from unloading of the musculoskeletal system results in bone loss and could also degrade the soft connective tissues (i.e. cartilage, meniscus, ligaments), which are critical to the proper functionality of the joint. Degradation of the soft tissues is important because it leads to laxity and joint instability, which when combined with loss of bone strength, could amplify the risk of bone fracture and joint injury. The increased fracture and injury risks in astronauts could compromise a mission and hinder recovery upon returning to Earth. One established animal model for simulating and studying the effects of microgravity is hindlimb unloading (HLU) in		

Task Description:	mice. While changes in the bone have been studied in this model, quantitative assessment of soft tissues is difficult due to limitations in spatial resolution of MRI imaging. In addition, how this bone loss translates to loss of functional bone strength is not known. Our lab has developed and is continually refining a new technique to image soft tissues with high resolution microCT, which enables quantitative analysis of bone and soft tissues in the mouse knee. The proposed research investigates changes in the bone and soft tissues of the knee joint through these specific aims: Aim 1: Develop technology for imaging soft tissues of the knee using microCT. Aim 2: Assess the joint damage resulting from HLU and recovery upon reloading. The expected outcomes from this research provide a better understanding of how joint tissues degrade and recover from long-term exposure to microgravity. In addition, the newly developed ability to quantitatively image the soft tissues of the mouse knee enables the HLU model to be a valuable tool for development of countermeasures that protect both the bone and soft tissues against microgravity.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2013.
Bibliography Type:	Description: (Last Updated: 03/30/2016)