

Fiscal Year:	FY 2013	Task Last Updated:	FY 09/17/2013
PI Name:	Ploutz-Snyder, Lori L. Ph.D.		
Project Title:	Integrated Resistance and Aerobic Exercise Training with Small Compact Exercise Equipment		
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) Aerobic: Risk of Reduced Physical Performance Capabilities Due to Reduced Aerobic Capacity (2) Bone Fracture: Risk of Bone Fracture due to Spaceflight-induced Changes to Bone (3) Muscle: Risk of Impaired Performance Due to Reduced Muscle Size, Strength and Endurance (4) Osteo: Risk Of Early Onset Osteoporosis Due To Spaceflight		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
PI Email:	lorips@umich.edu	Fax:	FY
PI Organization Type:	UNIVERSITY	Phone:	(734) 764-5210
Organization Name:	University of Michigan		
PI Address 1:	OBL 4170, 1402 Washington Hts.		
PI Address 2:	School of Kinesiology		
PI Web Page:			
City:	Ann Arbor	State:	MI
Zip Code:	48109-2013	Congressional District:	12
Comments:	Previously at Universities Space Research Association/NASA Johnson Space Center until July 2016.		
Project Type:	GROUND	Solicitation / Funding Source:	2011 Crew Health NNJ11ZSA002NA
Start Date:	09/01/2012	End Date:	08/31/2015
No. of Post Docs:	0	No. of PhD Degrees:	0
No. of PhD Candidates:	0	No. of Master' Degrees:	0
No. of Master's Candidates:	0	No. of Bachelor's Degrees:	0
No. of Bachelor's Candidates:	0	Monitoring Center:	NSBRI
Contact Monitor:	Contact Phone:		
Contact Email:			
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Haddad, Fadia (University of California, Irvine) Caiozzo, Vincent (University of California, Irvine) Adams, Gregory (University of California, Irvine) Ryder, Jeffrey (Universities Space Research Association) Scott, Jessica (Universities Space Research Association)		
Grant/Contract No.:	NCC 9-58-MA02801		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	<p>This proposal aims to validate in an analog setting a small compact exercise device for the protection of cardiovascular, muscle, and bone health. This study leverages both currently funded NSBRI and NASA work to bring together for the first time, a promising new exercise device and exercise prescription thus placing this study at a high countermeasure readiness level (moving from 6-7). More specifically, the NSBRI funded M-MED device uses a flywheel to provide loading for either high force-low repetition resistance exercise or low force-high repetition, endurance exercise (rowing). Recent data support M-MED training effectiveness in both ambulatory subjects and over 10 days of muscle unloading using unilateral lower limb suspension model. Accordingly, a new NASA funded exercise prescription study integrating resistance and aerobic training (iRAT) has been effective in the preservation of muscle and cardiovascular function over 14 days of bedrest, but requires the use of 5 different exercise machines. This proposal will combine the M-MED exercise device and the iRAT exercise prescription into a 70 day bedrest study. Outcome measurements related to cardiovascular, muscle and bone health will be obtained and integrated to assess countermeasure effectiveness.</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	<p>The comparison of a single exercise device to an ISS-like suite of exercise equipment will inform long duration exploration exercise hardware requirements.</p>
Task Progress:	<p>Data collection for the control and the traditional exercise subjects (70 days of bed rest) is ongoing. In the fall we expect to enroll the first MMED bed rest subject.</p>
Bibliography Type:	<p>Description: (Last Updated: 04/29/2023)</p>