Fiscal Year:	FY 2023	**Task Last Updated:**	FY 05/23/2023
PI Name:	Narayanan, Anand Ph.D.		
Project Title:	Partial Gravity and Sex-Difference Effects on the Venous Circulation		
Division Name:	Space Biology		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:			
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	None		
Human Research Program Risks:	None		
Space Biology Element:	(1) Cell & Molecular Biology (2) Animal Biology: Vertebrate		
Space Biology Cross-Element Discipline:	(1) Developmental Biology (2) Immunology		
Space Biology Special Category:	(1) Cell Culture		
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Zip Code:	32306-0001	**Congressional District:**	2
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2021 Space Biology NNH21ZDA001N-SBAS E.11: Animal Studies
Start Date:	06/01/2023	**End Date:**	05/31/2024
No. of Post Docs:		**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:**	NASA ARC
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Delp, Michael Ph.D. (Florida State University)		
Grant/Contract No.:	80NSSC23K0885		
Performance Goal No.:			
Performance Goal Text:			
Task Description:	NASA Space Biology aims to understand organism adaptations to the spaceflight environment. An understudied area of space biology is the spaceflight adaptation of the venous circulation. The venous circulation supports the cardiovascular system, and in turn all organs of the body, by transporting blood and its contents away from organ systems toward the heart and lungs. Consequently, venous return impacts cardiac function. As NASA aims to send astronauts to the Moon and Mars, understanding the adaptations of the venous circulation to microgravity, lunar gravity, and Martian gravity will not only increase our knowledge of cardiovascular function in space along a gravity continuum, but also uncover new potential astronaut medical risks. Furthermore, NASA will also be sending the first female astronaut into deep space as part of the Artemis Moon venture, and to date there exists no literature on possible sex differences of the venous circulation in response to spaceflight. This study will be the first comprehensive assessment of venous circulation		

	adaptations to a simulated gravity continuum, and also investigate sex differences to increase our knowledge of male and female cardiovascular space biology adaptations. This study will investigate, for the first time, the functional, structural, and molecular adaptations of veins from multiple organ beds (head, heart, digestive system, and bone) to identify vascular biology, immunological, and local organ system physiological adaptations to simulated spaceflight environment conditions. In completing this study, we will have increased our overall knowledge and understanding of space biology, as well as identify prospective health risks of our astronauts in advance of their journeys into deep space.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2023.
Bibliography Type:	Description: (Last Updated: 12/19/2023)