Fiscal Year:	FY 2018	**Task Last Updated:**	FY 01/09/2019
PI Name:	Stahn, Alexander Ph.D.		
Project Title:	Hyper.Campus - Effects of Artificial Gravity on Structural and Functional Plasticity During Head-Down Tilt Bed Rest		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:			
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **HFBP**:Human Factors & Behavioral Performance (IRP Rev H)		
Human Research Program Risks:	(1) **BMed**:Risk of Adverse Cognitive or Behavioral Conditions and Psychiatric Disorders		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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City:	Philadelphia	**State:**	PA
Zip Code:	19104-4865	**Congressional District:**	3
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2015-16 HERO NNJ15ZSA001N-AGBR. Appendix G: Physiological & Behavioral Responses in Humans to Intermittent Artificial Gravity during Bed Rest
Start Date:	04/10/2018	**End Date:**	12/31/2020
No. of Post Docs:		**No. of PhD Degrees:**	
No. of PhD Candidates:	2	**No. of Master' Degrees:**	
No. of Master's Candidates:		**No. of Bachelor's Degrees:**	
No. of Bachelor's Candidates:		**Monitoring Center:**	NASA JSC
Contact Monitor:	Williams, Thomas	**Contact Phone:**	281-483-8773
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:	Two PhD students, who are critical to the study, are included as key to study implementation: • Anika Werner, Charite - Universitatsmedizin Berlin, Institute of Physiology, Center for Space Medicine and Extreme Environments Berlin, CharitéCrossOver (CCO), Charitéplatz 1, Virchowweg 6, 10117 Berlin, Email: anika.werner@charite.de, and • Katharina Brauns, Charite - Universitatsmedizin Berlin, Institute of Physiology, Center for Space Medicine and Extreme Environments Berlin, CharitéCrossOver (CCO), Charitéplatz 1, Virchowweg 6, 10117 Berlin, Email: Katharina.brauns@charite.de		

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Grant/Contract No.:	80NSSC18K0765
Performance Goal No.:	
Performance Goal Text:	
Task Description:	The Human Factors and Behavioral Performance (HFBP) Element of the NASA Human Research Program (HRP) defines the prevention of adverse health consequences including neurocognitive impairment as one of the key milestones of Artificial Gravity (AG) countermeasure developments. Remarkably, the neurophysiological correlate of cognitive performance changes (especially spatial cognition) associated with AG has received little attention. In fact, research on the effects of intermittent AG on structural and functional changes of the brain is presently lacking completely. While the entire brain may be prone to structural and functional changes as a result of body unloading and AG, the hippocampal formation -- a key area for the brain for memory formation and spatial navigation and one of the only two human brain areas exhibiting neurogenesis -- is expected to be highly vulnerable to stress and a key target for mitigating neurocognitive impairments. The overarching goal of the present proposal is therefore to quantify the effects of different protocols of intermittent AG during 60 days of HDBR (head down bed rest) on cortical neuroplasticity related to behavioral outcomes associated with neural control of the cardiovascular system and spatial cognition, and biochemical correlates. Using state-of-the art neuroimaging, ultrasound imaging, and cognitive tools, measures made in HDBR participants will be contrasted with a control group matched for gender, age, and educational background. The data will also be compared to data from two additional European Space Agency (ESA) HDBR studies of the same length, as well as data obtained from long-duration International Space Station (ISS) missions, Antarctic expeditions, and Human Exploration Research Analog (HERA) isolation studies. These studies employ very similar procedures that allow comparing the effectiveness of AG to exercise as well as to nutritional countermeasures. At the end of the project, we will have a clear understanding whether, and to what extent, any effects on neuroplasticity and behavioral health associated with HDBR can be augmented by a centrifugation countermeasure.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2018.
Bibliography Type:	Description: (Last Updated: 02/16/2022)