Fiscal Year:	FY 2020	**Task Last Updated:**	FY 10/22/2020
PI Name:	Gaidica, Matthew Ph.D.		
Project Title:	Manipulating Sleep Architecture as an Operational Countermeasure		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	TRISH--TRISH		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	None		
Human Research Program Risks:	None		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
PI Email:	mgaidica@umich.edu	**Fax:**	FY
PI Organization Type:	UNIVERSITY	**Phone:**	650-963-6888
Organization Name:	University of Michigan, Ann Arbor		
PI Address 1:	Department of Neuroscience		
PI Address 2:			
PI Web Page:			
City:	Ann Arbor	**State:**	MI
Zip Code:	48109	**Congressional District:**	12
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2020 TRISH-RFA-2001-PD: Translational Research Institute for Space Health (TRISH) Postdoctoral Fellowships
Start Date:	08/01/2020	**End Date:**	07/31/2022
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:**	TRISH
Contact Monitor:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:	NOTE: End date changed to 7/31/2022 (originally 7/31/2021) per TRISH (Ed., 11/2/20)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Dantzer, Ben Ph.D. (MENTOR: University of Michigan, Ann Arbor)		
Grant/Contract No.:	NNX16AO69A-P0502		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	POSTDOCTORAL FELLOWSHIP Space exploration exposes humans to unique stressors that if not addressed compromise physical and psychological health and performance. Sleep is known to promote physiologic resilience making it paramount in challenging circumstances, but all sleep is not the same. Progressive, stereotyped sleep stages are common in mammals and form a basic structure known as “sleep architecture.” High homeostatic value has been placed on slow-wave sleep (SWS), which is the deepest state of sleep characterized synchronous 1–4 Hz brain oscillations. SWS co-occurs with important fluid rhythms and changes in neural microstructure that promote waste clearing, potentially underlying the important findings that SWS enhances memory and performance. This proposal aims to identify critical conditions for which enhancing SWS through non-invasive audio stimulation may mitigate the influence of stressors or augment performance. We propose a novel translational analog in the wild red squirrel as it is a freely behaving, tractable rodent model that exhibits human sleep patterns. The extreme northern latitude of the field site for this study provides an opportunity to investigate how a SWS countermeasure fares under varying, long-duration changes in circadian cueing. We will measure neural, cardiac, and accelerometry data to analytically describe how sleep architecture, autonomic markers of stress, and cognitive/physical performance interact. A major goal of this project is to concurrently refine the SWS countermeasure into a configurable, autonomous tool capable of being deployed towards long-duration human space missions. The perceived significance of the proposed work is to span evidence to products that bridge fundamental research towards understanding the foundations of performance and resilience while providing an operational toolset alongside empirically derived implementation strategy.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2020.
Bibliography Type:	Description: (Last Updated: 04/10/2024)