Fiscal Year:	FY 2019	**Task Last Updated:**	FY 10/03/2019
PI Name:	Kiffer, Frederico C. Ph.D.		
Project Title:	Effects of Galactic Cosmic Radiation on Translationally-Relevant Cognitive Behaviors and Response to Social Stress (Postdoctoral Fellowship)		
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		
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City:	Philadelphia	**State:**	PA
Zip Code:	19104-4318	**Congressional District:**	3
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2019 TRISH RFA-1901-PD Translational Research Institute for Space Health (TRISH) Postdoctoral Fellowships
Start Date:	08/01/2019	**End Date:**	07/31/2021
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:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Eisch, Amelia Ph.D. (Mentor: Children's Hospital of Philadelphia)		
Grant/Contract No.:	NNX16AO69A-P0402		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	POSTDOCTORAL FELLOWSHIP Astronauts on a Mars mission will be exposed to potentially harmful levels of charged-particle radiation. Thirty years of basic research with ground-based charged-particle radiation has provided overwhelming evidence that the rodent Central Nervous System (CNS) and behavior are negatively affected by charged-particles, suggesting this is a concern for astronaut health. However, the current literature has several caveats, including using young rather than fully-adult rodents, lack of studies focused on the female rodent CNS, unrealistic single-particle radiation simulations, lack of feasible therapeutic countermeasures, and behavioral tests with low translational potential and high handling- or experimenter-induced variability. Additionally, no published CNS study has yet assessed the effects of charged-particle radiation in combination with spaceflight-relevant stressors. We will address these limitations by exposing male and female mice of astronaut age to a novel, complex, but realistic Galactic Cosmic Ray simulation (GCR) then examining network-dependent behavioral performance on a highly-translational, appetitive touch-screen platform, including a behavioral test battery that can be viewed as analogous to the tests currently used on astronauts aboard the International Space Station. A separate group of mice will be examined for the influence of GCR on their ability to cope with social and physical stress in a validated mouse model of depression. Finally, we will test a promising anti-inflammatory drug, its ability to prevent GCR-induced deficits in cognition and social defeat stress. This proposal will address a wide range of NASA-defined knowledge gaps in its Human Research Roadmap. Specifically, we strive to provide a model basis for identifying individuals who are resilient to the extreme spaceflight conditions, validate a measure for monitoring behavioral health, determine radiation dose thresholds for behavioral measures in a domain basis and in combination with social defeat stress, all of which will help inform NASA's risk models for a crewed mission to Mars.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2019.
Bibliography Type:	Description: (Last Updated: 12/15/2020)