Task Book Report Generated on: 04/24/2024

Project Title: Influence of Exercise Modality on Cerebral-Ocular Hemodynamics and Pressares    Program Dicision Name:   Ituman Research	Fiscal Year:	FY 2015	Task Last Updated:	FY 11/20/2014
Project Title: Influence of Exercise Modulity on Cerebral-Ocular Hemotynamics and Pressures  Program/Discipline:  TechPort: No  TechPort: No  No  TechPort: No  No  TechPort: No  No  Idunual Research Program Element:  Olicanus accurate Risk of Cardiovascular Adaptations Contributing to Adverse Mission Performance and Health Outsermeasure:  Outscomes  O	PI Name:			
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Program/Discipline-  Element/Subdiscipline-  John Agency Name: TechPort: No   No   Junia Agency Name: TechPort: No   No   Junia Agency Name: TechPort: No   Junia Agency Name: Human Research Program Elements: (1) HIC-Human Health Countermeasures: (2) Cardion secular Adaptations Contributing to Adverse Mission Performance and Health Countermeasures: (2) SANS-Risk of Spaceflight Associated Neuro-scular Syndrome (SANS)   Space Biology Cross-Element   None   Space Biology Cross-Element   None   Space Biology Cross-Element   None   Space Biology Special Category: None   Space Biology Special Category: None   Fax: FY   Pl Organization Type: None   None   Space Biology Special Category: None   Memorial Slom Kettering Cancer Center   Pl Address 1: 1275 Vork Ave   Memorial Slom Kettering Cancer Center   Pl Address 2: Lez Jones Lab, Exercise Oncology Research Program   Level Memorial Slom Kettering Cancer Center   Pl Address 2: Lez Jones Lab, Exercise Oncology Research Program   Level Memorial Slom Kettering Cancer Center   Pl Address 2: Lez Jones Lab, Exercise Oncology Research Program   Level Memorial Slom Kettering Cancer Center New York, NY, in summer 2017; formerly at Linversities Space Research Association, Houston   Funding 2013 HERO (NNJ13ZSA002N-Crew Health Source)   Norte (Ed. 3.1.18); Moved to Memorial Slom Kettering Cancer Center, New York, NY, in summer 2017; formerly at Linversities Space Research Association, Houston   Funding 2013 HERO (NNJ13ZSA002N-Crew Health Source)   Norte (Ed. 3.1.18); Moved to Memorial Slom Kettering Cancer Center, New York, NY, in summer 2017; formerly at Linversities Space Research Association   Funding 2013 HERO (NNJ13ZSA002N-Crew Health Source)   Norte (Ed. 3.1.18); Moved to Memorial Slom Kettering Cancer Center, New York, NY, in summer 2017; formerly at Linversities Space Research Association   Policy Cancer Contact Plane:   No. of Phab Degrees:   No. of Phab Degr		Human Research		
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Human Research Program Risks:  (1) HIC-Human Health Countermeasures  (1) Carlativascular Risk of Cardiovascular Adaptations Contributing to Adverse Mission Performance and Health Outcomes (2) SANS-Risk of Spaceflight Associated Neuro-ocular Syndrome (SANS)  Space Biology Element None  None  None  None  PI Email: Space Biology Special Category: None  PI Email: Space Biology Special Category: None  PI Email: Space Biology Special Category: None  PI Cagnization Type: NON-PROFIT Phone:  Organization Type: NON-PROFIT Ploan:  1275 York Ave PI Address 1: 1275 York Ave PI Address 2: Lee Jones Lab, Exercise Oncology Research Program  PI Web Page:  City: New York State: NY  Zip Code: None  Organization Space Biology Special Category: Norte (Ed., R.I.18): Moved to Memorial Sloan Kettering Cancer Center, New York, NY, in summer 2017; formerly at Universities Space Research Association, Hostston  Project Type: GROUND  GROUND  Solicitation / Funding Source: OMNHIUS  Start Date: 10012014 Body Source: OMNHIUS  Start Date: No. of Post Does: No. of Post Does: No. of Backelor's Candidates: No. of Master' Degrees: No. of Backelor's Candidates: No. of Master' Degrees: No. of Backelor's Candidates: No. of Bac				
Human Research Program Risks:   (1) Cardiovascular-Risk of Cardiovascular Adaptations Contributing to Adverse Mission Performance and Health Outcomes (2) SANS Stiks of Spaceflight Associated Neuro-ocular Syndrome (SANS)	Joint Agency Name:		TechPort:	No
Human Research Program Risks:  ClasANS-Risk of Spaceflight Associated Neuro-ocular Syndrome (SANS)  Space Biology Cross-Element  None  Space Biology Cross-Element  None  PI Email:  Soutil Idmakec org  Fax: FY  PI Organization Type:  NON-PROFIT  NON-PROFIT  Phone:  Organization Type:  NON-PROFIT  PI Address 1:  1275 York Ave  PI Address 2:  Loe Jones Lab, Exercise Oncology Research Program  PI Web Page:  City:  New York  None  NOTE (Ed. 8.1.18): Moved to Memorial Sloan Kettering Cancer Center  Project Type:  GROUND  Solicitation / Funding  2013 HERO NNJ13ZSA002N-Crew Health  Source:  No. of Post Does:  No. of Post Does:  No. of Post Does:  No. of Post Does:  No. of Master' Degrees:  No. o	<b>Human Research Program Elements:</b>	(1) <b>HHC</b> :Human Health Countermeasure	es	
Space Biology Cross-Element Discipline:  Space Biology Special Category:  None  PI Email:  scott ifomskec.org  Pi Examil:  scott ifomskec.org  Space Biology Special Category:  NoN-PROFIT  Phone:  Ploganization Type:  NON-PROFIT  Phone:  Ploganization Name:  Memorial Sloan Kettering Cancer Center  PI Address 1:  1275 York Ave  PI Address 2:  Le Jones Lab, Exercise Oncology Research Program  PI Web Page:  City:  New York  State: NY  Zip Code:  10065  Congressional District:  12  Comments:  NoTIE (Ed., 8.1.18): Moved to Memorial Sloan Kettering Cancer Center, New York, NY, in summer 2017; formerly at Universities Space Research Association, Houston  Project Type:  GROUND  Solicitation / Funding 2013 HERO NNJ13ZSA002N-Crew Health Source:  OMNIBUS  Start Date:  No. of Phot Des:  No. of Phot Des:  No. of Phot Des:  No. of Master' Degrees:  No. of Master' Degrees:  No. of Bachelor's Candidates:  No. of Bachelor's Candidates:  No. of Bachelor's Candidates:  No. of Bachelor's Candidates:  Norsk, Peter  Contact Email:  Peter aorski@nasa.nov  Flight Program:  Flight Program:  Flight Program:  Flight Program:  Flight Assignment:  Key Personnel Changes/Previous PI:  Westly, Christian Ph.D. (University of Alberta)  Martin, David B.A. (Wyle Laboratories, Inc.)  Ploutz-Snyder, Roher Ph.D. (Universities Space Research Association)  Martin, David, R.D. (Universities Space Research Association)  Martin, David, R.D. (Universities Space Research Association)  Westly, Christian Ph.D. (Universities Space Research Association)  Westly, Christian Ph.D. (Universities Space Research Association)  Westly, Christian Ph.D. (Universities Space Research Association)	Human Research Program Risks:	Outcomes		
Discipline: Space Biology Special Category: None  PI Email: Scott Idemokec.org Fax: FY  NON-PROFIT Phore:  Organization Type: NON-PROFIT Organization Name: Memorial Sloan Kettering Cancer Center  PI Address 1: 1275 York Ave  PI Address 2: Lee Jones Lah, Excreise Oncology Research Program  PI Web Page: City: New York State: NY  Zip Code: 10065 Congressional District: 12  Comments: NOTE (Ed., 8.1.18): Moved to Memorial Sloan Kettering Cancer Centler, New York, NY, in summer 2017; formerly at Universities Space Research Association, Houston  Project Type: GROUND Solicitation / Funding 2013 HERO NNJ13ZSA002N-Crew Health Source: Ombig Congressional District: 10001/2014 End Date: 09/30/2016  No. of PhD Degrees: No. of PhD Degrees: No. of PhD Candidates: No. of Backelor's Degrees: No. of Master's Candidates: No. of Master's Candidates: No. of Master's Candidates: No. of Backelor's Candidates: No. of Backelor's Candidates: No. of Backelor's Candidates: No. of Backelor's Candidates: No. of Sackelor's Candidates: No. of Sackelor's Candidates: No. of Sackelor's Candidates: No. of Sackelor's Candidates: No. of Master's Candidates: No. of Master's Candidates: No. of Master's Candidates: No. of Master's Candidates: No. of Sackelor's Candidates: No. of Sackelor's Candidates: No. of Sackelor's Candidates: No. of Master's Candidates: No. of	Space Biology Element:	None		
PI Email:  Scotti I domskee.org  NON-PROFIT  Phone:  Organization Type:  NON-PROFIT  Phone:  Organization Name:  Memorial Sloan Kettering Cancer Center  PI Address 1:  1275 York Ave  PI Address 2:  Lee Jones Lab, Exercise Oncology Research Program  PI Web Page:  City:  New York  State: NY  Zip Code:  10065  Congressional District: 12  Comments:  NOTE (Ed., 8.1.18): Moved to Memorial Sloan Kettering Cancer Center, New York, NY, in summer 2017; formerly at Universities Space Research Association, Houston  Project Type:  GROUND  Solicitation / Funding 2013 HERO NNJ13ZSA002N-Crew Health Source:  OMNIBUS  Start Date:  1001/2014  End Date: 09/30/2016  No. of Post Does:  No. of PhD Candidates:  No. of Master' Degrees:  No. of Master' Degrees:  No. of Master's Candidates:  No. of Bachelor's Candidates:  Nostk, Peter  Contact Email:  Peter norsk@masa.gov  Flight Program:  Flight Assignment:  Key Personnel Changes/Previous PI:  Martin, David B.A. (Wyle Laboratories, Inc.)  Plotuz-Snyder, Lori Ph.D. (Universities Space Research Association)  Plotuz-Snyder, Lori Ph.D. (Universities Space Research Association)  Grant/Contract No.:  Internal Project  Performance Goal No.:		None		
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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: No. of Bachelor's Degrees: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Candidates: Norsk, Peter Contact Phone: Contact Email: Peter.norsk@nasa.gov Flight Program: Flight Assignment: Key Personnel Changes/Previous PI:  COI Name (Institution): Haykowsky, Mark Ph.D. (University of Alberta) Martin, David B.A. (Wyle Laboratories, Inc.) Ploutz-Snyder, Robert Ph.D. (Universities Space Research Association) Stenger, Michael Ph.D. (Universities Space Research Association) Westby, Christian Ph.D. (Universities Space Research Association) Internal Project Performance Goal No.:	Project Type:	GROUND		
No. of PhD Candidates: No. of Master's Candidates: No. of Bachelor's Degrees: No. of Bachelor's Candidates: No. of Bachelor's Degrees: No. of Bachelor's Candidates: No. of Bachelor's Degrees: No.	Start Date:	10/01/2014	End Date:	09/30/2016
No. of Master's Candidates:  No. of Bachelor's Degrees:  No. of Bachelor's Candidates:  Monitoring Center: NASA JSC  Contact Monitor:  Norsk, Peter Contact Phone:  Contact Email:  Peter.norsk@nasa.gov  Flight Program:  Flight Assignment:  Key Personnel Changes/Previous PI:  Haykowsky, Mark Ph.D. (University of Alberta) Martin, David B.A. (Wyle Laboratories, Inc.) Ploutz-Snyder, Robert Ph.D. (Universities Space Research Association) Ploutz-Snyder, Robert Ph.D. (Universities Space Research Association) Stenger, Michael Ph.D. (Wyle Laboratories, Inc.) Westby, Christian Ph.D. (Universities Space Research Association)  Grant/Contract No.:  Internal Project	No. of Post Docs:		No. of PhD Degrees:	
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Task Book Report Generated on: 04/24/2024

CENTRAL OBJECTIVES: To date, 19 out of 25 long-duration crew members (76%) have experienced in-flight and/or post-flight vision changes. These changes define the visual impairment/intracranial pressure (VIIP) syndrome. Although the exact cause of VIIP is unknown at this time, it is suspected that the microgravity-induced shift in fluids from the lower body to the upper body (cephalad fluid shift) plays a significant role. This fluid shift, in turn, may cause an elevation in intracranial pressure (ICP) and intraocular pressure (IOP). Another factor that has been proposed to contribute to VIIP is exercise. Although moderate and high intensity aerobic or resistance exercise have clearly identified benefits for cardiac, muscle, and bone health, whether such exercise contributes to the development of VIIP is unknown.

METHODS: Our overall goal is to characterize the impact of 3 exercise modalities used by astronauts on cerebral blood flow, ICP, and IOP. We propose to use head down tilt (HDT), a ground based analog that is well established to elicit similar cephalad fluid shifts as spaceflight. Subjects will undergo 3 HDT sessions: 1) HDT + resistance exercise, 2) HDT + moderate intensity aerobic exercise, and 3) HDT + high intensity aerobic exercise. During and following each HDT session cerebral blood flow, IOP, and ICP will be measured.

**Task Description:** 

SIGNIFICANCE: Information characterizing factors contributing to the VIIP syndrome is of fundamental importance for sustaining human presence in space and extending the exploration of our Solar system. NASA's Human Research Program (HRP) has therefore established risks and gaps related to determining the etiology of visual acuity and ocular structural and functional changes observed in- and post-flight, and identifying safe and effective countermeasure to mitigate changes in ocular structure and intracranial hypertension. This proposal addresses the NASA request for short-term proposals that could lead to novel breakthroughs addressing one or more risks and gaps. Our proposal is specifically relevant for: Risk of Spaceflight-Induced Intracranial Hypertension/Vision Alterations and the following Gaps: Gap VIIP1: What are the etiological mechanisms and contributing risk factors for ocular structural and functional changes seen in-flight and post-flight? Gap VIIP13: Identify preventative and treatment countermeasures to mitigate changes in ocular structure and function and intracranial pressure during spaceflight. It is expected that results from the proposed investigation will provide important information that could ultimately not only improve the well being of astronauts in microgravity and upon return to Earth, but could also enhance the well-being of numerous populations such as individuals with intracranial hypertension and glaucoma.

## **Rationale for HRP Directed Research:**

**Research Impact/Earth Benefits:** 

It is expected that results from the proposed investigation will provide important information that could ultimately not only improve the well being of astronauts in microgravity and upon return to Earth, but could also enhance the well-being of numerous populations such as individuals with intracranial hypertension and glaucoma.

Task Progress:

New project for FY2015.

**Bibliography Type:** 

Description: (Last Updated: 09/05/2019)