Task Book Report Generated on: 04/30/2024

Project Title: Spaceflight Effects on Neurocognitive Performance: Extent, Longevity, and Neural Bases  Division Name: Human Research  Program/Discipline-  Flement/Suddiscipline-  Flement/Suddiscipline-  Flement/Suddiscipline-  Flement/Suddiscipline-  Flement/Suddiscipline-  Flement/Suddiscipline-  Flement/Suddiscipline-  Flement/Suddiscipline-  Human Research Program Flements: (1) HHC-Human Health Countermeasures  Joint Agency Name: TechPort: No  Human Research Program Elements: (2) Sensorimotor Risk of Advicac Outcomes Due to Indecquate Human Systems Integration Architecture  (2) Sensorimotor Risk of Advicac Outcomes Due to Indecquate Human Systems Integration Architecture  (2) Sensorimotor Risk of Advicac Outcomes Due to Indecquate Human Systems Integration Architecture  (2) Sensorimotor Risk of Advicac Outcomes Due to Indecquate Human Systems Integration Architecture  (2) Sensorimotor Risk of Advicac Outcomes Due to Indecquate Human Systems Integration Architecture  (2) Sensorimotor Risk of Advicac Outcomes Due to Indecquate Human Systems Integration Architecture  (2) Sensorimotor Risk of Advicac Outcomes Due to Indecquate Human Systems Integration Architecture  (2) Sensorimotor Risk of Advicac Outcomes Due to Indecquate Human Systems Integration Architecture  (2) Sensorimotor Risk of Advicac Outcomes Due to Indecquate Human Systems Integration Architecture  (3) Programization Type: Planent Type: Program Systems Integration Architecture  (4) Organization Type: Planent Type				
Project Title: Spaceflight Effects on Neumoognitive Performance: Extent, Longovity, and Neural Bases  Birision Nume: Human Research  Program/Discipline:  Program/Discipline:  Program/Discipline:  HUMAN RESEARCH—Biomedical countermeasures  Elements Shidscipline:  Joint Agency Name: TechPort: No  Human Research Program Elements:  (I) HINA Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (2) Sensorimotor/Risk of Altered Sensorimotor/Vesibular Function Impacting Critical Mission Tasks  Space Biology Element: None  Space Biology Cross-Element  None  Space Biology Cross-Element  None  Bicelpline:  Premail: Parallel Program Risks:  University of Florida  Premail: Phane: 352-294-1722  University of Florida  Premail: Phane: 352-294-1722  University of Florida  Premail: Applied Physiology & Kinesiology  Pri Address 1: Applied Physiology & Kinesiology  Pri Address 2: PLG 142, P.O. Box 118205  Pri Web Page:  City: Gaine-ville Sall-18-205 Congressional District: 3  Comments: NOTE: Pri moved to University of Florida in July 2017: previous artification was University of Michigan.  Project Type: Flacitif GROUND Solicitation / Funding Source: 2010 Crew Health NNJ10/Z8A003N  Start Date: No. of Pab Dese: Son. of Pab Deserve:  No. of Pab Dese: Son. of Pab Deserve: No. of Pab Deserve: No. of Bachelor's Candidates: No. of Master' Degrees: 1  No. of Master's Candidates: No. of Bachelor's Degrees: 1  No. of Master's Candidates: No. of Bachelor's Degrees: 1  No. of Master's Candidates: No. of Bachelor's	Fiscal Year:	FY 2022	Task Last Updated:	FY 02/13/2023
Division Name: Illuman Research Program/Dicipline- Elementaly-buddicipline: HUMAN RESEARCH-Biomedical countermeasures Elementaly-buddicipline: HUMAN RESEARCH-Biomedical countermeasures Elementaly-buddicipline: HUMAN RESEARCH-Biomedical countermeasures  Human Research Program Elements: (1) HHC-Human Health Countermeasures  Human Research Program Elements: (1) HHC-Human Health Countermeasures  Human Research Program Risks: (1) HEAL Risks of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture  (2) Sensor/monter-Risk of Altered Sensor/monter/Vestibular Function Impacting Critical Mission Tasks  Space Biology Element: None  Space Biology Element: None  None  Space Biology Special Category: None  PI Famil: Program Family Program Space Risks of Altered Sensor/monter/Vestibular Function Impacting Critical Mission Tasks  Space Biology Special Category: None  PI Famil: Program: Program	PI Name:	Seidler, Rachael D. Ph.D.		
Program/Discipline: Program/Discipline- Element/Subdiscipline- Element/Subdiscipline- Element/Subdiscipline- Idinit Agency Name:  Human Research Program Elements:  (1) HHC-Human Health Countermeasures  (1) HHC-Human Health Countermeasures  (2) Sentorminator/Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (2) Sentorminator/Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (2) Sentorminator/Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (2) Sentorminator/Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (2) Sentorminator/Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (2) Sentorminator/Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (2) Sentorminator/Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (2) Sentorminator/Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (2) Sentorminator/Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (2) Sentorminator/Risk of Adverse Outcomes Outcomes Outcomes Integration Architecture (2) Sentorminator/Risk of Adverse Outcomes Outcomes Outcomes Integration Architecture (3) Page 18	Project Title:	Spaceflight Effects on Neurocognitive Performance: Extent, Longevity, and Neural Bases		
Program/Discipline-  Element/Subdiscipline-  Element/Subdiscipline-  Element/Subdiscipline-  Element/Subdiscipline-  Illuman Research Program Elements	Division Name:	Human Research		
Element/Subdiscipline:  Joint Agency Name:  Joint Agency Name:  Human Research Program Elements:  O) HISCHuman Health Countermeasures  Uly Hisch Rich of Advence Outcomes Due to Inadequate Human Systems Integration Architecture (2) Senor/imotor/Risk of Albrerd Sensorimotor/Vestibular Function Impacting Critical Mission Tasks  Space Biology Cross-Element  None  Space Biology Cross-Element  None  Pl Email:  machaelesider@aff.eda  Pl Agency Cross-Element  program Risks:  Applied Physiology & Kinesiology  Pl Address 1:  Applied Physiology & Kinesiology  Pl Address 2:  FLG 142, P. O. Box 118205  Pl Web Page:  City:  Gainesville  Joint John John John Source:  City:  Gainesville  Joint Joi	Program/Discipline:			
Human Research Program Elements: (1) HIIC-Human Health Countermeasures  Human Research Program Risks: (1) HSIA; Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (2) Sensorimotor-Risk of Altered Sensorimotor-Vestibular Function Impacting Critical Mission Tasks  Space Biology Cross-Element None  Space Biology Cross-Element None  None  Pl Email: rachaelscider@ufl.edu Fax: FY  Pl Organization Type: UNIVERSITY Phone: 352-294-1722  Organization Name: University of Florida  Pl Address 1: Applied Physiology & Kinesiology  Pl Address 2: FLG 142, P.O. Box 118205  Pl Web Page:  City: Gainesville State: FL  Zip Code: 32611-8205 Congressional District: 3  Comments: NOTTE: Pl moved to University of Florida in July 2017; previous affiliation was University of Michigan.  Project Type: FLIGHT,GROUND Solicitation / Funding Source: 2010 Crew Health NNJ107SA003N Start Date: 97/14/2017 End Date: 96/30/2022  No. of Pab Decs: 5 No. of PhD Degrees:  No. of PhD Candidates: No. of PhD Candidates: No. of PhD Candidates: No. of Bachelor's Degrees: I  No. of Master' Candidates: No. of Bachelor's Candidates: Monitoring Center: NASA JSC: Contact Monitor: Stenger, Michael Monitoring Center: NASA JSC: Contact Monitor: Stenger, Michael Monitoring Center: NASA JSC: Contact Monitor: Stenger, Michael Monitoring Center: NASA JSC: Contact Monitor: Michael Monitoring Center: NASA JSC: NOTE: End date changed to 9/30/2022 per NSC information (Ed., 2/5/22) NOTE: End date changed to 9/30/2022 per NSC information (Ed., 10/9/19)  Key Personnel Changes/Previous Pl: May 2021 report: Scott Wood, Ph.D., is now Controvestigator on the project for his subject matter expertise.  Bloomberg, Jacob Ph.D. (NASA Johnson Space Center) Mulayana, Ajiukumar Ph.D. (Valsa Johnson Space Center) Michael Monitoring Center Monitoring Center Monitoring Center Monitoring Center Monitor	Program/Discipline Element/Subdiscipline:	HUMAN RESEARCHBiomedical countermean	sures	
Human Research Program Risks:  (1) HSIA:Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (2) Sensorimotor-Risk of Altered Sensorimotor-Vestibular Function Impacting Critical Mission Tasks  Space Biology Cross-Element None  Space Biology Cross-Element None  Space Biology Special Category: None  PI Email:  rachaelscider@outl.edu PE arx: PY  PH one: 352-294-1722  Organization Type: UNIVERSITY Phone: 352-294-1722  Organization Name: University of Florida PI Address 1: Applied Physiology & Kinesiology PI Address 2: PI Address 2: PI Address 2: FIG 142, P.O. Box 118205  PI Web Page: City: Gainesville State: FL Zip Code: 32611-8205 Congressional District: 3  Comments: NOTE: PI moved to University of Florida in July 2017; previous affiliation was University of Michigan. Project Type: FILIGHT.GROUND Solicitation / Funding Source: 2010 Crew Health NNJ10ZSA003N Start Date: 09/30/2022 No. of Post Does: 5 No. of Phot Deardidates: No. of Phot Deardidates: No. of Phot Deardidates: No. of Master' Candidates: No. of Master' Candidates: No. of Master' Scandidates: No. of Bachelor's Degrees: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Master' Candidates: No. of Master' Candidates: No. of Senger, Michael Contact Monitor: Stenger, Michael NOTE: End date changed to 9/30/2022 per NSSC information (Ed., 2/5/22) NOTE: End date changed to 9/30/2022 per NSSC information (Ed., 10/9/19)  Key Personnel Changes/Previous PI: May 2021 report: Scott Wood, Ph.D., is now Contract Jumaion (Ph., 8/27/20) NOTE: Changed end date to 9/30/2022 per NSSC information (Ed., 10/9/19)  Rey Personnel Changes/Previous PI: May 2021 report: Scott Wood, Ph.D., is now Contract Association ) Wood, Scott Ph.D. (NASA Johnson Space Center) Multivaria, Ajitkumar Ph.D. (Universities Space Research Association) Wood, Scott Ph.D. (NASA Johnson Space Center) Performance Goal No.:	Joint Agency Name:		TechPort:	No
### Space Biology Element   None	<b>Human Research Program Elements:</b>	(1) <b>HHC</b> :Human Health Countermeasures		
Space Biology Cross-Element Discipline:  Space Biology Special Category:  None  PI Email:  rachaelscidler@ufl.edu  PI Address 1:  Applied Physiology & Kinesiology  PI Address 2:  FI.G 142, P.O. Box 118205  PI Web Page:  City:  Gainesville  State: FL  Zjp Code:  32611-8205  Compressional District: 3  Comments:  NOTE: PI moved to University of Florida in July 2017; previous affiliation was University of Michigan.  Project Type:  FLIGHT.GROUND  Solicitation / Funding Source:  2010 Crew Health NN110ZSA003N  Start Date:  07/14/2017  Fand Date:  09/30/2022  No. of Pab Does:  5  No. of Pab Degrees:  No. of Pab Degrees:  No. of Bachelor's Degrees:  No. of Bachelor's Candidates:  No	Human Research Program Risks:			
Space Biology Special Category: None   Space Biology Special Category: None   PI Email: rabaelseidler@ufl.edu   Fax: FY	Space Biology Element:	None		
PI Email:  rachaelseidler@ufl.edu  Pi Organization Type:  UNIVERSITY  Phone: 352-294-1722  Organization Name:  University of Florida  PI Address 1:  Applied Physiology & Kinesiology  PI Address 2:  FLG 142, P.O. Box 118205  PI Web Page:  City:  Gainesville  State: FL  Zip Code:  32611-8205  Congressional District: 3  Comments:  NOTE: PI moved to University of Florida in July 2017; previous affiliation was University of Michigan.  Project Type:  FLIGHT,GROUND  Solicitation / Funding Source: 2010 Crew Health NNJ10ZSA003N  Start Date:  07/14/2017  End Date:  09/30/2022  No. of Phot Deardidates:  No. of Phot Deardidates:  No. of Phot Deardidates:  No. of Master' Degrees:  No. of Bachelor's Candidates:  No. of Master' Degrees:  No. of Bachelor's Candidates:  No. of Bach	Space Biology Cross-Element Discipline:	None		
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City: Gainesville State: FL  Zip Code: 32611-8205 Congressional District: 3  Comments: NOTE: PI moved to University of Florida in July 2017; previous affiliation was University of Michigan.  Project Type: FLIGHT, GROUND Solicitation / Funding Source: 2010 Crew Health NNJ10ZSA003N  Start Date: 07/14/2017 End Date: 09/30/2022  No. of Post Does: 5 No. of PhD Degrees: No. of PhD Candidates: 3 No. of Master' Degrees: 1  No. of Master's Candidates: No. of Bachelor's Degrees: 1  No. of Bachelor's Candidates: Monitoring Center: NASA JSC  Contact Monitor: Stenger, Michael Contact Phone: 281-483-1311  Contact Email: michael-b.stenger@nasa.gov  Flight Program:  NOTE: End date changed to 9/30/2022 per NSSC information (Ed., 2/5/22)  NOTE: End date changed to 9/30/2021 per D. Risin/HRP and NSSC information (Ed., 8/27/20)  NOTE: Changed end date to 9/30/2020 per NSSC information (Ed., 10/9/19)  Key Personnel Changes/Previous PI: May 2021 report: Scott Wood, Ph.D., is now Colnvestigator on the project for his subject matter expertise.  COI Name (Institution): Bloomberg, Jacob Ph.D. ( NASA Johnson Space Center )  Mulavara, Ajitkumar Ph.D. ( Universities Space Research Association )  Wood, Scott Ph.D. ( NASA Johnson Space Center )  Grant/Contract No.: 80NSSC17K0461  Performance Goal No.:	PI Address 2:	FLG 142, P.O. Box 118205		
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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 D	Start Date:	07/14/2017	End Date:	09/30/2022
No. of Master's Candidates:  No. of Bachelor's Degrees:  No. of Bachelor's Degrees:  No. of Bachelor's Candidates:  No. of Bachelor's Candidates:  No. of Bachelor's Candidates:  No. of Bachelor's Degrees:  NASA JSC  Contact Monitor:  Stenger, Michael  michael b. stenger@nasa.gov  Flight Program:  NOTE: End date changed to 9/30/2022 per NSSC information (Ed., 2/5/22)  NOTE: End date changed to 9/30/2021 per D. Risin/HRP and NSSC information (Ed., 8/27/20)  NOTE: Changed end date to 9/30/2020 per NSSC information (Ed., 10/9/19)  Key Personnel Changes/Previous PI:  May 2021 report: Scott Wood, Ph.D., is now Colnvestigator on the project for his subject matter expertise.  COI Name (Institution):  Bloomberg, Jacob Ph.D. (NASA Johnson Space Center)  Mulavara, Ajitkumar Ph.D. (Universities Space Research Association)  Wood, Scott Ph.D. (NASA Johnson Space Center)  Grant/Contract No.:  80NSSC17K0461  Performance Goal No.:	No. of Post Docs:	5	No. of PhD Degrees:	
No. of Bachelor's Candidates:  Contact Monitor:  Stenger, Michael  Contact Phone: 281-483-1311  Contact Email:  michael.b.stenger@nasa.gov  Flight Program:  NOTE: End date changed to 9/30/2022 per NSSC information (Ed., 2/5/22) NOTE: End date changed to 9/30/2021 per D. Risin/HRP and NSSC information (Ed., 8/27/20) NOTE: Changed end date to 9/30/2020 per NSSC information (Ed., 10/9/19)  Key Personnel Changes/Previous PI:  May 2021 report: Scott Wood, Ph.D., is now Collovestigator on the project for his subject matter expertise.  Bloomberg, Jacob Ph.D. (NASA Johnson Space Center) Mulavara, Ajitkumar Ph.D. (Universities Space Research Association) Wood, Scott Ph.D. (NASA Johnson Space Center) Grant/Contract No.:  80NSSC17K0461  Performance Goal No.:	No. of PhD Candidates:	3	No. of Master' Degrees:	1
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Contact Email: michael.b.stenger@nasa.gov  Flight Program:  NOTE: End date changed to 9/30/2022 per NSSC information (Ed., 2/5/22) NOTE: End date changed to 9/30/2021 per D. Risin/HRP and NSSC information (Ed., 8/27/20) NOTE: Changed end date to 9/30/2020 per NSSC information (Ed., 10/9/19)  Key Personnel Changes/Previous PI: May 2021 report: Scott Wood, Ph.D., is now CoInvestigator on the project for his subject matter expertise.  COI Name (Institution): Bloomberg, Jacob Ph.D. ( NASA Johnson Space Center ) Mulavara, Ajitkumar Ph.D. ( Universities Space Research Association ) Wood, Scott Ph.D. ( NASA Johnson Space Center ) Grant/Contract No.: 80NSSC17K0461  Performance Goal No.:	No. of Bachelor's Candidates:		<b>Monitoring Center:</b>	NASA JSC
Flight Program:  NOTE: End date changed to 9/30/2022 per NSSC information (Ed., 2/5/22) NOTE: End date changed to 9/30/2021 per D. Risin/HRP and NSSC information (Ed., 8/27/20) NOTE: Changed end date to 9/30/2020 per NSSC information (Ed., 10/9/19)  Key Personnel Changes/Previous PI:  May 2021 report: Scott Wood, Ph.D., is now CoInvestigator on the project for his subject matter expertise.  Bloomberg, Jacob Ph.D. (NASA Johnson Space Center) Mulavara, Ajitkumar Ph.D. (Universities Space Research Association) Wood, Scott Ph.D. (NASA Johnson Space Center)  Grant/Contract No.:  80NSSC17K0461  Performance Goal No.:	Contact Monitor:	Stenger, Michael	Contact Phone:	281-483-1311
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Bloomberg, Jacob Ph.D. ( NASA Johnson Space Center ) Mulavara, Ajitkumar Ph.D. ( Universities Space Research Association ) Wood, Scott Ph.D. ( NASA Johnson Space Center )  Grant/Contract No.:  80NSSC17K0461  Performance Goal No.:		NOTE: Changed end date to 9/30/2020 per NSSC information (Ed., 10/9/19)		
COI Name (Institution):  Mulavara, Ajitkumar Ph.D. (Universities Space Research Association) Wood, Scott Ph.D. (NASA Johnson Space Center)  Grant/Contract No.:  80NSSC17K0461  Performance Goal No.:	Key Personnel Changes/Previous PI:	May 2021 report: Scott Wood, Ph.D., is now Col	investigator on the project for his	subject matter expertise.
Performance Goal No.:	COI Name (Institution):	Mulavara, Ajitkumar Ph.D. (Universities Space Research Association)		
	Grant/Contract No.:	80NSSC17K0461		
Performance Goal Text:	Performance Goal No.:			
	Performance Goal Text:			

Task Book Report Generated on: 04/30/2024

Task Description:

NOTE: Continuation of "Spaceflight Effects on Neurocognitive Performance: Extent, Longevity, and Neural Bases," grant NNX11AR02G, due to Principal Investigator Seidler's move to University of Florida from University of Michigan. NASA Research Announcement (NRA) NNJ10ZSA003N requested proposals to assess changes in elemental neurocognitive functions such as perception, motor control, memory, attention, language, executive function, and emotional processing following long duration spaceflight using both behavioral assessments and monitoring technologies such as fMRI. In response to this call, we propose to perform structural and functional MR brain imaging to identify the relationship between changes in crewmember neurocognitive function and neural structural alterations following a six month International Space Station mission. Our central hypothesis is that measures of brain structure, function, and network integrity will change from pre to post flight in crewmembers (Aim 1). Moreover, we predict that these changes will correlate with indices of cognitive, sensory, and motor function in a neuroanatomically selective fashion (Aim 2). Our interdisciplinary approach utilizes cutting edge neuroimaging techniques and a broad ranging battery of sensory, motor, and cognitive assessments that will be conducted pre flight, during flight, and post flight to investigate neuroplastic and maladaptive brain changes in crewmembers following long duration spaceflight. Success in this endeavor would 1) result in identification of the underlying neural mechanisms and operational risks of spaceflight-induced changes in behavior, and 2) identify whether a return to normative behavioral function following re-adaptation to Earth's gravitational environment is associated with a restitution of brain structure and function or instead is supported by substitution with compensatory brain processes.

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

**Research Impact/Earth Benefits:** 

The results of this project will have relevance not only to understanding the effects of spaceflight on the human brain and behavior, but also for delineating the capacity of the brain to remodel in response to adaptive stimuli. As such, the results should prove informative for understanding the neural mechanisms associated with adaptive behavioral change and the rehabilitation of these changes during recovery periods.

NASA Research Announcement (NRA) NNJ10ZSA003N requested proposals to assess changes in elemental neurocognitive functions such as perception, motor control, memory, attention, language, executive function, and emotional processing following long duration spaceflight, using both behavioral assessments and monitoring technologies such as functional magnetic resonance imaging (fMRI). In response to this call, we proposed to perform structural and functional MR brain imaging to identify the relationship between changes in crewmember neurocognitive function and neural structural alterations following a six month International Space Station mission. Our central hypothesis was that measures of brain structure, function, and network integrity would change from pre to post flight in crewmembers (Aim 1). Moreover, we predicted that these changes would correlate with indices of cognitive, sensory, and motor function in a neuroanatomically selective fashion (Aim 2). Our interdisciplinary approach utilizes cutting edge neuroimaging techniques and a broad range of sensory, motor, and cognitive assessments that were conducted pre flight, during flight, and post flight to investigate neuroplastic and maladaptive brain changes in crewmembers following long duration spaceflight. Success in this endeavor would 1) result in identification of the underlying neural mechanisms and operational risks of spaceflight-induced changes in behavior, and 2) identify whether a return to normative behavioral function following re-adaptation to Earth's gravitational environment is associated with a restitution of brain structure and function or, instead, is supported by substitution with compensatory brain processes.. Over the past year, we have continued to make progress with our data analyses and dissemination of results. For example, we published our findings showing that mobility and balance decline from pre to postflight, suggesting possible disruption and/or down-weighting of vestibular inputs; these behaviors recovered to baseline levels within 30 days postflight. We also identified bimanual coordination declines pre to postflight; recovery to baseline levels was also evident within 30 days postflight. There were no performance changes in dual task cost during or following long duration spaceflight, although it may be that our secondary task was not sufficiently difficult to elicit effects. This work has been recently published (Tays et al. 2021, Frontiers in Neural Circuits). [Ed. Note: See Cumulative Bibliography.]

Task Progress:

We also published a case study describing brain changes in a Crewmember who experienced an Aborted Launch ("CAL"). CAL's launch and landing experience was dissociated from prolonged microgravity exposure. Using MRI, we found that hypergravity exposure during the aborted launch did not induce lasting ventricular enlargement or intracranial fluid shifts resembling those previously reported with spaceflight. This case study therefore rules out hypergravity during launch and landing as a contributing factor to previously reported long-lasting intracranial fluid changes following spaceflight. This work was published in McGregor et al. 2021, Frontiers in Neurology.

We also reported our findings illustrating brain and behavioral evidence for sensory reweighting from pre to postflight. We used functional MRI to measure brain activity in response to vestibular stimulation pre and post-spaceflight. We also measured vestibularly-mediated behaviors, including balance, mobility, and rod-and-frame test performance. As expected, vestibular stimulation at the preflight sessions elicited activation of the parietal opercular area ("vestibular cortex") and deactivation of somatosensory and visual cortices. Pre to postflight, we found widespread reductions in this somatosensory and visual cortical deactivation, supporting sensory compensation and reweighting with spaceflight. These pre to postflight changes in brain activity correlated with changes in eyes closed standing balance, and greater pre to postflight reductions in deactivation of the visual cortices associated with less postflight balance decline. The observed brain changes recovered to baseline values by three months postflight. Together, these findings provide evidence for sensory reweighting and adaptive cortical neuroplasticity with spaceflight. These results have implications for better understanding compensation and adaptation to vestibular functional disruption. These findings were published in Hupfeld et al. 2022, Cerebral Cortex.

**Bibliography Type:** 

Description: (Last Updated: 01/24/2024)

**Articles in Peer-reviewed Journals** 

Tays GD, Hupfeld KE, McGregor HR, Salazar AP, De Dios YE, Beltran NE, Reuter-Lorenz PA, Kofman IS, Wood SJ, Bloomberg JJ, Mulavara AP, Seidler RD. "The effects of long duration spaceflight on sensorimotor control and cognition." Front. Neural Circuits. 2021 October 26;15:723504. <a href="https://doi.org/10.3389/fncir.2021.723504">https://doi.org/10.3389/fncir.2021.723504</a>; <a href="https://doi.org/10.3389/fncir.2021.723504">PMID: 34764856</a>; <a href="https://doi.org/10.3389/PMID: 34764856</a>; <a href="https://doi.org/10.33

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Articles in Peer-reviewed Journals	McGregor HR, Hupfeld KE, Pasternak O, Wood SJ, Mulavara AP, Bloomberg JJ, Hague TN, Seidler RD. "Case report: No evidence of intracranial fluid shifts in an astronaut following an aborted launch." Front. Neurol. 2021 Dec 9;12:774805. <a href="https://doi.org/10.3389/fneur.2021.774805">https://doi.org/10.3389/fneur.2021.774805</a> ; <a href="https://doi.org/10.3389/fneur.2021.774805">PMID: 34956056</a> ; <a href="https://doi.org/10.3389/fneur.2021.774805">PMID: 34956056</a> ; <a href="https://doi.org/10.3389/fneur.2021.774805">PMCID: PMC8695608</a> , <a href="https://doi.org/10.3389/fneur.2021.774805">Dec-2021</a>	
Articles in Peer-reviewed Journals	Hupfeld KE, McGregor HR, Koppelmans V, Beltran NE, Kofman IS, De Dios YE, Riascos RF, Reuter-Lorenz PA, Wood SJ, Bloomberg JJ, Mulavara AP, Seidler RD. "Brain and behavioral evidence for reweighting of vestibular inputs with long-duration spaceflight." Cereb Cortex. 2022 Feb 8;32(4):755-69. <a href="https://doi.org/10.1093/cercor/bhab239">https://doi.org/10.1093/cercor/bhab239</a> ; <a href="https://doi.org/10.1093/cercor/bhab239">PMID: 34416764</a> ; <a href="https://doi.org/10.1093/cercor/bhab239">PMCID: PMC8841601</a> , Feb-2022	
Articles in Peer-reviewed Journals	Hupfeld KE, Richmond SB, McGregor HR, Schwartz DL, Luther MN, Beltran NE, Kofman IS, De Dios YE, Riascos RF, Wood SJ, Bloomberg JJ, Mulavara AP, Silbert LC, Iliff JJ, Seidler RD, Piantino J. "Longitudinal [magnetic resonance imaging] MRI-visible perivascular space (PVS) changes with long-duration spaceflight." Sci Rep. 2022 May 5;12:7238. <a href="https://doi.org/10.1038/s41598-022-11593-y">https://doi.org/10.1038/s41598-022-11593-y</a> ; <a href="https://doi.org/10.1038/s41598-022-11593-y">PMID: 35513698</a>	
Articles in Peer-reviewed Journals	Mahadevan AD, Hupfeld KE, Lee JK, De Dios YE, Kofman IS, Beltran NE, Mulder E, Bloomberg JJ, Mulavara AP, Seidler RD. "Head-down-tilt bed rest with elevated CO2: Effects of a pilot spaceflight analog on neural function and performance during a cognitive-motor dual task." Front Physiol. 2021 Aug 25;12:654906. <a href="https://doi.org/10.3389/fphys.2021.654906">https://doi.org/10.3389/fphys.2021.654906</a> ; <a href="https://doi.org/10.3389/fphys.2021.654906">PMID: 34512371</a> ; <a href="https://doi.org/10.3389/fphys.2021.654906">P</a>	