Fiscal Year:	FY 2020	**Task Last Updated:**	FY 03/09/2020
PI Name:	Jansson, Christer Ph.D.		
Project Title:	C4 Photosynthesis in Space (C4Space)		
Division Name:	Space Biology		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:			
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	None		
Human Research Program Risks:	None		
Space Biology Element:	(1) Cell & Molecular Biology (2) Plant Biology		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	99354-1793	**Congressional District:**	4
Comments:			
Project Type:	FLIGHT	**Solicitation / Funding Source:**	2018 Space Biology (ROSBio) NNH18ZTT001N-FG. App B: Flight and Ground Space Biology Research
Start Date:	02/11/2020	**End Date:**	02/11/2023
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:		**Monitoring Center:**	NASA KSC
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Ahkami, Amirhossein Ph.D. (Battelle Memorial Institute) Handakumbura, Pubudu Ph.D. (Battelle Memorial Institute) Hixson, Kim Ph.D. (Battelle Memorial Institute) Rivas-Ubach, Albert Ph.D. (Battelle Memorial Institute) Stanfill, Bryan Ph.D. (Battelle Memorial Institute)		
Grant/Contract No.:	Department of Energy IAA		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	C4 plants like maize (Zea mays) and sorghum (Sorghum bicolor) have a more efficient photosynthesis than C3 plants such as wheat (Triticum aestivum) and rice (Oryza sativa) due to a CO2-concentrating mechanism (CCM). How this CCM and the performance of C4 plants are impacted by space travel is unknown. We propose to compare the impact of space-station conditions on C3 and C4 metabolism using Brachypodium (Brachypodium distachyon) and Setaria (Setaria viridis) as model systems for C3 and C4 plants, respectively, and develop models that describe the molecular mechanisms for how C3 and C4 metabolisms are reprogrammed in the space environment compared to Earth. The obtained information would provide fundamental knowledge about C3 and C4 metabolism in space and could also be leveraged for evaluating the potential for growing small-stature cereal and vegetable C4 crops like foxtail millet (Setaria italica) and Amaranthus sp. for biogenerative support in future space explorations.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2020.
Bibliography Type:	Description: (Last Updated:)