Fiscal Year:	FY 2014	**Task Last Updated:**	FY 04/04/2014
PI Name:	Simon, Julianna Ph.D.		
Project Title:	Improving Kidney Stone Detection in Space Analogs (Postdoctoral Fellowship)		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	NSBRI--Smart Medical Systems and Technology Team		
Joint Agency Name:		**TechPort:**	Yes
Human Research Program Elements:	(1) **ExMC**:Exploration Medical Capabilities		
Human Research Program Risks:	(1) **ExMC**:Risk of Unacceptable Health and Mission Outcomes Due to Limitations of In-flight Medical Capabilities (IRP Rev E)		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
PI Email:	jcsimon@uw.edu; jcsimon@psu.edu	**Fax:**	FY
PI Organization Type:	UNIVERSITY	**Phone:**	206-221-6584
Organization Name:	University of Washington		
PI Address 1:	Applied Physics Laboratory/Center for Industrial and Medical Ultrasound (APL/CIMU)		
PI Address 2:	1013 NE 40th St.		
PI Web Page:			
City:	Seattle	**State:**	WA
Zip Code:	98105	**Congressional District:**	7
Comments:			
Project Type:	GROUND	**Solicitation:**	2013 NSBRI-RFA-13-01 Postdoctoral Fellowships
Start Date:	01/01/2014	**End Date:**	12/31/2015
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:**	NSBRI
Contact Monitor:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Bailey, Michael Ph.D. (MENTOR/ University of Washington)		
Grant/Contract No.:	NCC 9-58-PF03505		
Performance Goal No.:			
Performance Goal Text:			
Task Description:	POSTDOCTORAL FELLOWSHIP Astronauts are at an increased risk of forming kidney stones because of dehydration and altered bone metabolism. A stone, while innocuous in the kidney, will often pass spontaneously causing debilitating pain that will affect mission operations. Even worse, large stones can become obstructing when they attempt to pass, resulting in a serious infection or even death without surgical intervention. The goal of this proposal is to develop an ultrasound imaging protocol to detect stones before they become dangerous. Early detection will allow for planned intervention through the administration of stone-dissolving medications, scheduled transport to Earth, or an ultrasound-based stone pushing technique in development at the University of Washington. The twinkling artifact is a rapid color change that can highlight hard objects, such as kidney stones, on a grey-scale ultrasound image; however, twinkling currently appears inconsistently on		

	clinical ultrasound machines. Our team recently showed that twinkling is caused by bubbles on the stone surface and bubbles will be very sensitive to the changes in gravity and pressure that occur in space. In this proposal, we will use our knowledge of bubbles and ultrasound to increase twinkling. Using modeling and experimentation in environments that mimic space, we will develop and test imaging protocols to demonstrate their ability to detect stones in astronauts before they grow large enough to become dangerous.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	0
Task Progress:	New project for FY2014.
Bibliography Type:	Description: (Last Updated: 03/15/2018)