Fiscal Year:	FY 2018	**Task Last Updated:**	FY 06/21/2018
PI Name:	Bell, Suzanne Ph.D.		
Project Title:	A US-Russian Collaborative Proposal for Data Collection in HERA: The Relationship between Composition, Interpersonal Relations, and Team Effectiveness in Space Crews		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Behavior and performance		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **HFBP**:Human Factors & Behavioral Performance (IRP Rev H)		
Human Research Program Risks:	(1) **Team**:Risk of Performance and Behavioral Health Decrements Due to Inadequate Cooperation, Coordination, Communication, and Psychosocial Adaptation within a Team		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	77058	**Congressional District:**	36
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2015-16 HERO NNJ15ZSA001N-ILSRA. Appendix F: International Life Sciences Research Announcement
Start Date:	08/12/2016	**End Date:**	08/11/2019
No. of Post Docs:		**No. of PhD Degrees:**	
No. of PhD Candidates:	5	**No. of Master' Degrees:**	1
No. of Master's Candidates:	4	**No. of Bachelor's Degrees:**	
No. of Bachelor's Candidates:		**Monitoring Center:**	NASA JSC
Contact Monitor:	Williams, Thomas	**Contact Phone:**	281-483-8773
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Flight Program:			
Flight Assignment:	NOTE: Element change to Human Factors & Behavioral Performance; previously Behavioral Health & Performance (Ed., 1/17/17)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Gushin, Vadim M.D., Ph.D. (Institute of Bio-Medical Problems RAS) Vinokhodova, Alla Ph.D. (Institute of Bio-Medical Problems RAS) Contractor, Noshir Ph.D. (Northwestern University) DeChurch, Leslie Ph.D. (Northwestern University)		
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Task Description:	The environments anticipated during Long-Distance Space Exploration Missions (LDSEM) will require crews diverse in national background, professional background, and gender to face a number of stressors such as living and working in isolated and confined environments (ICE) for an extended period of time, separation from family and friends, loss of or significant delay when in communication with the ground, and limited privacy. The unique challenges of LDSEM will require team members to rely on one another for social support and to keep conflict manageable. The long-term duration of the mission coupled with extreme living and working conditions means interpersonal compatibility among the crew members, and between the crew and mission control, will be essential to the success of any LDSEM. How crew composition and interpersonal relations affect crew functioning and effectiveness has been and continues to be of interest to both NASA and the Institute of Biomedical Problems (IBMP), whose research informs operations for Roscosmos. Over time, research related to interpersonal compatibility from these agencies has evolved with different emphases. NASA-sponsored team composition research heavily relies on trait and network theories. It seeks to identify traits and combinations of traits that can be used to compose, train, and manage highly effective crews (Team Gap 8). IBMP-sponsored research mostly has moved away from trait-based approaches toward an idiographic (in-depth, heavily descriptive) approach to researching crew interpersonal relations. Our research is a US-Russia collaborative research effort with two primary aims: (1) develop and empirically test a cutting-edge process model of interpersonal relationship formation in ICE, which integrates US and Russian approaches to examining interpersonal compatibility in ICE; and (2) Examine the validity of the Personal Self-Perception and Attitudes (PSPA), which is an approach utilized by the Russians to assess interpersonal compatibility and relations in ICE. To address these aims, we are conducting a 3-year research program in which we leverage existing data previously collected in the Mars 105 and Mars 500 simulations; collect new data using analog-definition research in the Human Exploration Research Analog (HERA) campaigns 4 and 5; and use a novel data analysis approach. Our efforts will result in research products critical to Team Gaps 1, 4, and 8, including an empirically supported model, recommendations for a path forward for international collaboration in research related to team composition and interpersonal relations in ICE, and a summary of validation evidence for the PSPA with recommendations for whether it should be included in NASA's standardized measures for analog environments.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	Results will contribute to a greater understanding of the life cycle of teams operating in isolated and confined environments (ICE), and the effective composition and management of future space crews. Particularly notable is the integration of Russian and US approaches to researching interpersonal compatibility. Our model makes significant contributions to team composition and interpersonal compatibility research by elaborating and testing the foundations of various states, which are individual, relational, and team events. This advancement is critical for understanding how personal attributes shape the subjective attitudes towards the self and towards others, and how relationships develop over time, which can affect the affect, motivation, cognition, and performance of the team. The specific propositions and research questions developed and tested in HERA are specific to ICE; thus, beyond space crews, the most direct application of the research findings will be to Earth teams that operate in ICE such as expedition and science teams in the Arctic and Antarctic. The general framework and analytic strategies we are developing to research interpersonal relationship formation, however, can be applied to Earth teams more generally.
Task Progress:	To address our research aims, we are conducting a three-year, multi-method research effort in which we: (a) refine an initial model and prepare for data collection in HERA (Phase I); (b) Collect data in the HERA campaigns 4 and 5 at the Johnson Space Center (Phase II); and (c) Analyze HERA data including relational event modeling, validation of the PSPA, and benchmarking of HERA data alongside data from Mars 105 and Mars 500 (Phase III). We have completed our second year of the project, and are currently in Phase II. Phase II is comprised mostly of analog-definition research in which we will empirically test our model; it is the primary thrust of this research. High resolution data were collected over multiple timepoints within a 45-day isolation protocol, which will allow us to utilize relational events modeling for our primary analyses. This past year we collected data from 4 missions in HERA campaign 4, and are currently collecting data from the 5th and final mission. We collected data prior to isolation on individual differences, the Personal Self-Perception and Attitudes (PSPA), and a baseline measure of our team interaction battery. We collected data during the 45 day isolation period using self-report survey, the PSPA, video and audio of specific team interactions, and performance. Post-isolation, we collected data using the PSPA, and a debrief interview and survey. These data each provide unique insight into how the HERA crew members behave and form relationships, as well as how the crews function as a whole. We ran preliminary analyses comparing the PSPA data from HERA crews with data from the Mars 105 and Mars 500 isolation experiments. We have also coded debrief interviews and used a grounded theory approach to understand the evolution of relationships between HERA crew members. Results were presented at conferences. Finally, we have done extensive data preparation on our performance data, and on the video and audio recordings. These preparations and preliminary data analysis will allow us to move into our next phase of the project including the relational event modeling. In addition to our intensive data collection and preliminary analysis, we also finalized our HERA campaign 5 protocol.
Bibliography Type:	Description: (Last Updated: 02/15/2024)
Awards	Bell ST. "Distinguished Alumnus "O" Award, Olivet Nazarene University, November 2017." Nov-2017
Awards	Bell ST. "Fellow of the Society for Industrial and Organizational Psychology, April 2018. " Apr-2018
Awards	Bell ST. "Fellow of the Association for Psychological Science, May 2018. " May-2018
Awards	Vazquez M. "24 Under 24 Leaders and Innovators in STEAM and Space by the Mars Generation in conjunction with Aerojet Rocketdyne and the United Launch Alliance, December 2017." Dec-2017
Significant Media Coverage	Winsborough D. (Interviewed Suzanne Bell) "'Predicting team success in outer space.' Interview of Suzanne Bell by Dave Winsborough." People + Strategy. 2018 Spring;41(2):62-4. http://go.galegroup.com/ps/anonymous?id=GALE%7CA535943013&sid=googleScholar&v=2.1&it=r&linkaccess=abs&issn=19464606&p=AONE&sw=w ; accessed 6/25/2018., Mar-2018