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3. Who will be presenting this material? Sigrid Reinsch
4. Title of Document: #1: GeneLab: Scientific partnerships and an open-access database to maximize usage of omics data from space biology experiments
5. Abstract: NASA's mission includes expanding our understanding of biological systems to improve life on Earth and to enable long-duration human exploration of space. The GeneLab Data System (GLDS) is NASA's premier open-access omics data platform for biological experiments. GLDS houses standards-compliant, high-throughput sequencing and other omics data from spaceflight-relevant experiments. The GeneLab project at NASA-Ames Research Center is developing the database, and also partnering with spaceflight projects through sharing or augmentation of experiment samples to expand omics analyses on precious spaceflight samples. The partnerships ensure that the maximum amount of data is garnered from spaceflight experiments and made publically available as rapidly as possible via the GLDS.

GLDS Version 1.0, went online in April 2015. Software updates and new data releases occur at least quarterly. As of October 2016, the GLDS contains 80 datasets and has search and download capabilities. Version 2.0 is slated for release in September of 2017 and will have expanded, integrated search capabilities leveraging other public omics databases (NCBI GEO, PRIDE, MG-RAST). Future versions in this multi-phase project will provide a collaborative platform for omics data analysis.

Data from experiments that explore the biological effects of the spaceflight environment on a wide variety of model organisms are housed in the GLDS including data from rodents, invertebrates, plants and microbes. Human datasets are currently limited to those with anonymized data (e.g., from cultured cell lines). GeneLab ensures prompt release and open access to high-throughput genomics, transcriptomics, proteomics, and metabolomics data from spaceflight and ground-based simulations of microgravity, radiation or other space environment factors. The data are meticulously curated to assure that accurate experimental and sample processing metadata are included with each data set. GLDS download volumes indicate strong interest of the scientific community in these data.

To date GeneLab has partnered with multiple experiments including two plant (*Arabidopsis thaliana*) experiments, two mice experiments, and several microbe experiments. GeneLab optimized protocols in the rodent partnerships for maximum yield of RNA, DNA and protein from tissues harvested and preserved during the SpaceX-4 mission, as well as from tissues from mice that were frozen intact during spaceflight and later dissected on the ground. Analysis of GeneLab data will contribute fundamental knowledge of how the space environment affects biological systems, and as well as yield terrestrial benefits resulting from mitigation strategies to prevent effects observed during exposure to space environments.

6. Three [Keywords](#): Bioinformatics, omics, spaceflight
7. Does this document embody a potential “[Lessons Learned](#)”? Yes No
8. Process this as a: Final document ready for release

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Date that you will present/date of venue: 10/25/2016

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Meeting or publication URL: <http://www.ascb.org/2016meeting/>

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15. Does this this document contain sensitive information? Yes No

16. Has a ARC310 has been initiated for this document? Yes No

17. Level of technical review? Peer Committee