

DAGSI Research Topic FY2021

1. **Research Title:** Omics and bioinformatics for microbiomes and materials
2. **Individual Sponsor:**

Dr. Vanessa Varaljay, AFRL/RXAS
AFRL/RXAS Bldg 654, Rm 338
2179 12th Street
WPAFB, OH 45433-7333
vanessa.varaljay.1@us.af.mil

3. **Academic Area/Field and Education Level**

Microbiology, (Bio)informatics, Biology, Biochemistry, Bioengineering (BA/BS, MS or PhD level)

4. **Objectives:** Use state-of-the-art 'omics tools and bioinformatics (including AI/ML) to predict activities of selected microorganisms isolated from aircraft and fuel tank materials. Engineer identified enzymes/pathways to biologically manufacture Air Force (AF)-relevant materials.
5. **Description:** Microorganisms, including bacteria and fungi, can inhabit AF aircraft and fuel tank materials. These microorganisms can survive on and even thrive on the coatings and biofuels present in these environments. The AF has isolated and identified the many microorganisms comprising the microbiomes of these environments. Employing -omics tools, such as genomics (DNA), transcriptomics (RNA), or proteomics (protein) would elucidate what enzymes these microorganisms harbor and produce under certain conditions (e.g., Under high temperatures or nutrient limitations). The use of multi-omics tools results in large amounts of data which are analyzed using sophisticated computational tools and software and on high computing clusters. This research opportunity will focus on integrating state-of-the-art -omics and bioinformatics of selected AF microorganisms to predict their activities and subsequently engineer their enzymes and pathways for materials production.
6. **Research Classification/Restrictions:** The research project is unclassified, open to US citizen students only
7. **Eligible Research Institutions:** Ohio state universities

NOTE: Topics submitted to DAGSI must be approved for public release. Need PA Approval #

Cleared for public release: 88ABW-2019-3463