Metagenome - SIP Projects in GOLD

Introduction

Metagenome Stable Isotope Probing (Metagenome - SIP) projects are experiments designed to analyze metabolically active microbial population growth through assimilation of stable isotope-labeled media (e.g. ^{13}C, ^{15}N, ^{18}O, etc). SIP Projects are composed of "SIP Parent" samples, which are metagenomic DNA extracted from microbial populations grown with unlabeled substrates (i.e. controls) or isotope-labeled compounds (i.e. treatments). Metabolically active microbial populations will assimilate isotope labels into biomass and DNA. To analyze the distribution of stable isotope assimilation, SIP Parent samples are separated by density gradient fractionation into "SIP Fraction" samples. For JGI Metagenome - SIP projects, SIP Fractions that originate from the same SIP Parent are co-assembled with metaSPAdes. In addition, all SIP Fractions project-wide are co-assembled with MetaHipMer. All co-assemblies, with either metaSPAdes or MetaHipMer, are assigned their own Analysis Project IDs (AP IDs) in the JGI IMG database.

This document will help guide users to the information about SIP projects, SIP Parents, and SIP Fractions metadata in the Genomes Online Database (GOLD). It will cover three search paths:
1. SIP projects on the GOLD homepage.
2. SIP projects *via* Search by Sequencing Strategy.
3. SIP Fraction metadata *via* Biosample ID.

1. SIP projects on the GOLD homepage.

One way to access SIP projects is the GOLD homepage e.g. by clicking on the count of "Combined Assembly SIP Metagenome" analysis projects in the Analysis Projects section:

Analysis Projects

Genome Analysis (Isolate) 215,039

Metagenome Analysis 105,211

Metagenome - Cell Enrichment 2,525

Metagenome - Single Particle Sort 6,552

Metagenome - Assembled Genome (MAG) 18,186

Metatranscriptome Analysis 16,517

Combined Assembly 732

Combined Assembly SIP Metagenome 6

Single Cell - Screened (SAG) 2,505

Single Cell - Unscreened (SAG) 7,963

Transcriptome Analysis 818

2. SIP projects *via* Search by Sequencing Strategy

  a. A more specific way to access SIP data is with GOLD's Advanced Search in the Search option of the menu bar:

  b. To specify SIP projects in the Advanced Search, in the Project Fields filter you may select "**Metagenome - SIP**" or "**Metagenome - SIP Parent**" as the desired Sequencing Strategy.

  c. When you submit your search, the results will be summarized:

d. Clicking on the numbers in these categories will show you a table of your results:

Your current search results are:

Studies	Biosamples	Organisms	Sequencing Projects	Analysis Projects
2	40	0	40	0

Current Filters:
Project.Sequencing Strategy → Metagenome - SIP Parent X

Clear All Filters | New Search | Download Results | **Refine Search Filters**

Select Columns for Table

GOLD Project ID 🔍	Project Name 🔍	Project Status 🔍	Add Date 🔍	Sequencing Strategy 🔍
Gp0592562	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O SIP	incomplete	2021-10-15	Metagenome - SIP Parent
Gp0592561	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 104_891_SD_DR_1m_c2_T1_18O SIP	incomplete	2021-10-15	Metagenome - SIP Parent
Gp0592560	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 103_881_SD_DR_1m_c1_T1_18O SIP	incomplete	2021-10-15	Metagenome - SIP Parent
Gp0592559	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 99_897_SD_DR_0cm_c3_T1_18O SIP	incomplete	2021-10-15	Metagenome - SIP Parent
Gp0592558	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 98_887_SD_DR_0cm_c2_T1_18O SIP	incomplete	2021-10-15	Metagenome - SIP Parent
Gp0592557	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 97_877_SD_DR_0cm_c1_T1_18O SIP	incomplete	2021-10-15	Metagenome - SIP Parent
Gp0592556	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 93_901_SD_DR_1m_c3_T1_16O SIP	incomplete	2021-10-15	Metagenome - SIP Parent
Gp0592555	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 92_891_SD_DR_1m_c2_T1_16O SIP	incomplete	2021-10-15	Metagenome - SIP Parent
Gp0592554	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 91_881_SD_DR_1m_c1_T1_16O SIP	incomplete	2021-10-15	Metagenome - SIP Parent

e. To view individual SIP Fractions, click on the GOLD Project ID and scroll to the Project Composition section of the Project Information tab, then click on the number of SIP Fractions:

Your current search results are:

Studies	Biosamples	Organisms	Sequencing Projects	Analysis Projects
1	18	0	18	13

Current Filters:
Project.SIP Parent → Gp0592562 ✕

Clear All Filters · New Search · Download Results · **Refine Search Filters**

Select Columns for Table

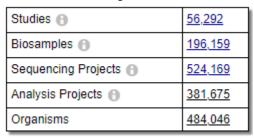| GOLD Project ID	Project Name	Project Status	Add Date	Sequencing Strategy
Gp0665662	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_4	incomplete	2022-07-29	Metagenome - SIP
Gp0665661	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_3	incomplete	2022-07-29	Metagenome - SIP
Gp0665660	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_2	incomplete	2022-07-29	Metagenome - SIP
Gp0665659	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_8	Permanent Draft	2022-07-29	Metagenome - SIP
Gp0665658	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_7	Permanent Draft	2022-07-29	Metagenome - SIP
Gp0665657	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_6	Permanent Draft	2022-07-29	Metagenome - SIP
Gp0665656	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_5	Permanent Draft	2022-07-29	Metagenome - SIP
Gp0665655	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_9	Permanent Draft	2022-07-29	Metagenome - SIP
Gp0665551	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_20	incomplete	2022-07-29	Metagenome - SIP
Gp0665540	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_14	Permanent Draft	2022-07-29	Metagenome - SIP
Gp0665538	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_15	Permanent Draft	2022-07-29	Metagenome - SIP
Gp0665536	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_16	Permanent Draft	2022-07-29	Metagenome - SIP
Gp0665535	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_17	Permanent Draft	2022-07-29	Metagenome - SIP
Gp0665534	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_10	Permanent Draft	2022-07-29	Metagenome - SIP
Gp0665532	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_11	Permanent Draft	2022-07-29	Metagenome - SIP
Gp0665530	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_12	Permanent Draft	2022-07-29	Metagenome - SIP
Gp0665528	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_13	Permanent Draft	2022-07-29	Metagenome - SIP
Gp0665525	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_19	incomplete	2022-07-29	Metagenome - SIP

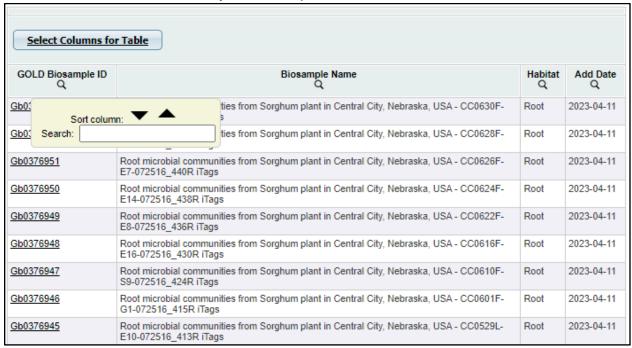| PROJECT COMPOSITION	
Study	Soil microbial communities from agricultural fields across the midwestern and eastern USA
Biosample	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_8
Analysis Projects	Soil microbial communities from an agricultural field in Butler, South Dakota, USA - 105_901_SD_DR_1m_c3_T1_18O_SIP_8
SIP Projects	SIP Parent Gp0592562 → 18 SIP Fractions
Number of Analysis Projects (AP)	1
Number of Derived Analyis Projects (DAP)	0

3.   SIP Fraction metadata *via* Biosample ID

SIP Fraction specific metadata is associated with the Biosample in GOLD. If you already know the GOLD Biosample ID for the SIP fraction of interest, you can navigate to the metadata with the following steps:

    a. If you are starting from an Advanced Search results page, you can skip to part 3b. If you are starting from the GOLD homepage, click on the "Biosamples" count:

Studies ⓘ	56,292
Biosamples ⓘ	196,159
Sequencing Projects ⓘ	524,169
Analysis Projects ⓘ	381,675
Organisms	484,046

    b. From the list of Biosamples, click on the search button under the "GOLD Biosample ID" column header and enter your Biosample ID and/or click on the ID link:

c. Once on the "Biosample Information" page, click on the "Biosample Source" tab to view fraction specific SIP metadata:

Biosample Information	Biosample Source	Environmental Metadata

✏ - indicates that you can edit this field inline. Click return to save your edits.

BIOSAMPLE ISOLATION

Sample Collection Site (MIGS-13) ⓘ	incubated agricultural soil
Sample Collection Date (MIGS-5) ⓘ	7/9/2019
Sample Collection Publication ⓘ	
Sample Isolation Comments	
Size Fraction ⓘ	
Sample Isolation Country/Ocean	USA
Sample Collection Method ⓘ	
Sample Contact Name ⓘ	Erin Nuccio
Sample Contact Email ⓘ	nuccio1@llnl.gov

SIP METADATA

Sample Volume (ul)	222
Concentration (ng/ul)	0.124
Fraction Density (g/ml)	1.6825
Sample Group Name	T1_0cm_SD
Isotope Label	Unlabeled