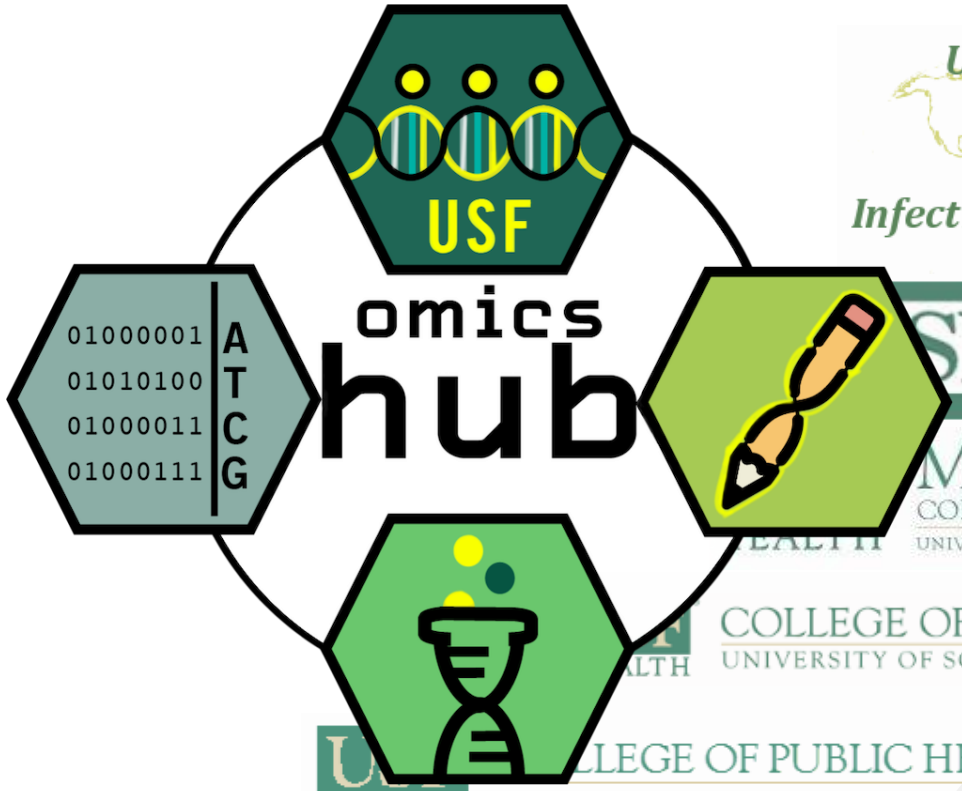
UNIVERSITY OF SOUTH FLORIDA
A PREEMINENT RESEARCH UNIVERSITY

GENOMICS PROGRAM



USF Global Health
GHIDR
Infectious Disease Research

USF UNIVERSITY OF SOUTH FLORIDA
COLLEGE OF ARTS & SCIENCES

MORSANI
COLLEGE OF MEDICINE
UNIVERSITY OF SOUTH FLORIDA

COLLEGE OF NURSING
UNIVERSITY OF SOUTH FLORIDA

HEALTH
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USF UNIVERSITY OF SOUTH FLORIDA
COLLEGE OF MARINE SCIENCE

USFSP UNIVERSITY OF SOUTH FLORIDA
ST. PETERSBURG

Microbiome Data-Analysis Workshop

Jenna Oberstaller, PhD

Interdisciplinary Sciences Liaison, USF Genomics

Managing Consultant, USF Omics Hub

ORIENTATION

- USF Genomics, the Hub
- Microbiome-research at USF
- Workshop purpose and goals
- Resources

PROGRAM STRUCTURE AND MISSION OVERVIEW

USF Genomics Program

❖ Establish a collaborative and open community to support all areas of Omics research at USF

Omics Hub

❖Build awareness for in-house capabilities
❖promote departmental and community growth

❖Computational and laboratory consulting in partnership with the Core
❖Encourage grants submission as collaborators
❖Provide training (bench, data analysis)

USF Genomics Core Facility

❖Core equipment to which certified users have **SUPERVISED** access after training and project-consultation with our Core experts

USF MICROBIOME INITIATIVE

- CROSS-USF and beyond
- Build USF's profile as a Leader in Microbiome-Research
- Support USF Researchers and foster interdisciplinary collaborations
  - Microbiome-awards

Career biolo
experts her
with you t

Featuring special guest-star Anujit Sarkar, PhD
Alman/Groer labs
Microbiome-specialist

g
e

Computational expertise

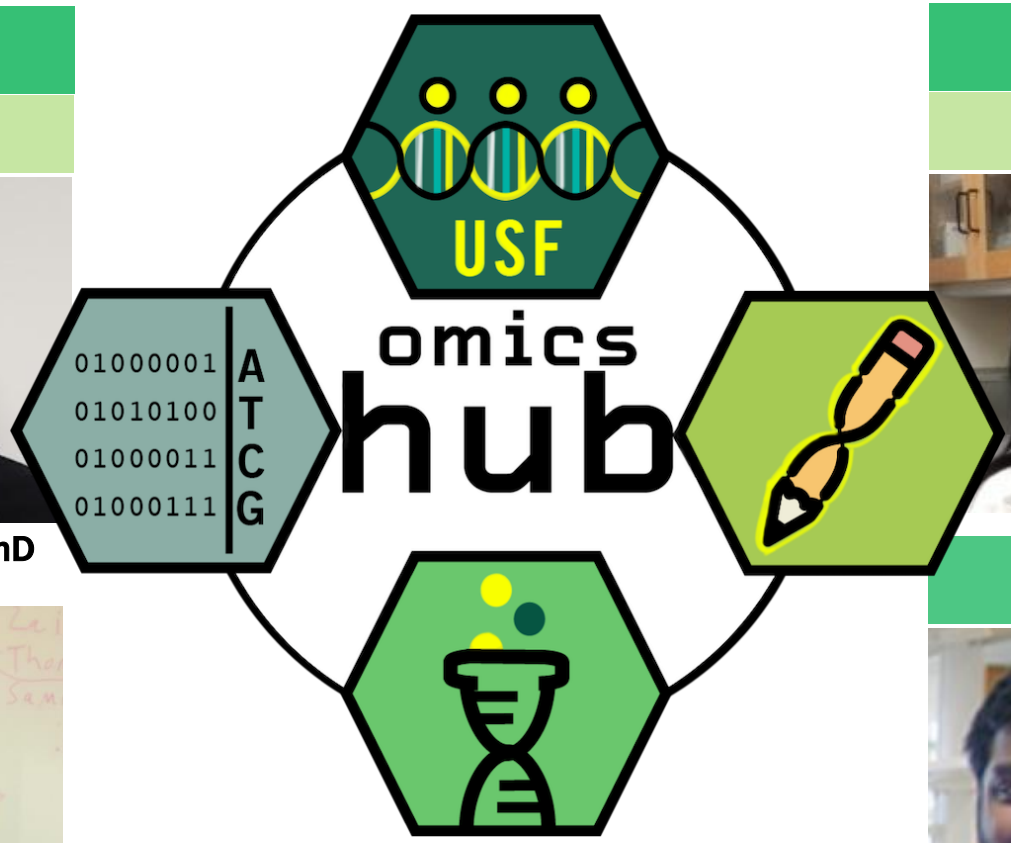
genomics@usf.edu

Jenna Oberstaller, PhD

Charley Wang, PhD

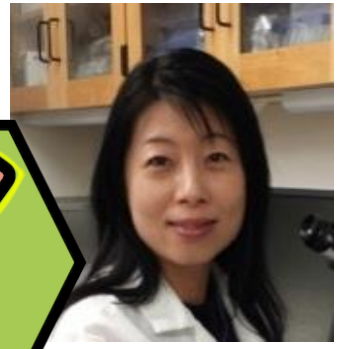
Thomas Keller, PhD

Justin Gibbons, PhD



Laboratory expertise

genomics@usf.edu



Min Zhang, MD

Core instrumentation expert

Honorary Hub affiliate

Swamy Rakesh Adapa, MS

Founding Hub member, Jiang-lab associate and Renaissance Man

genomics@usf.edu

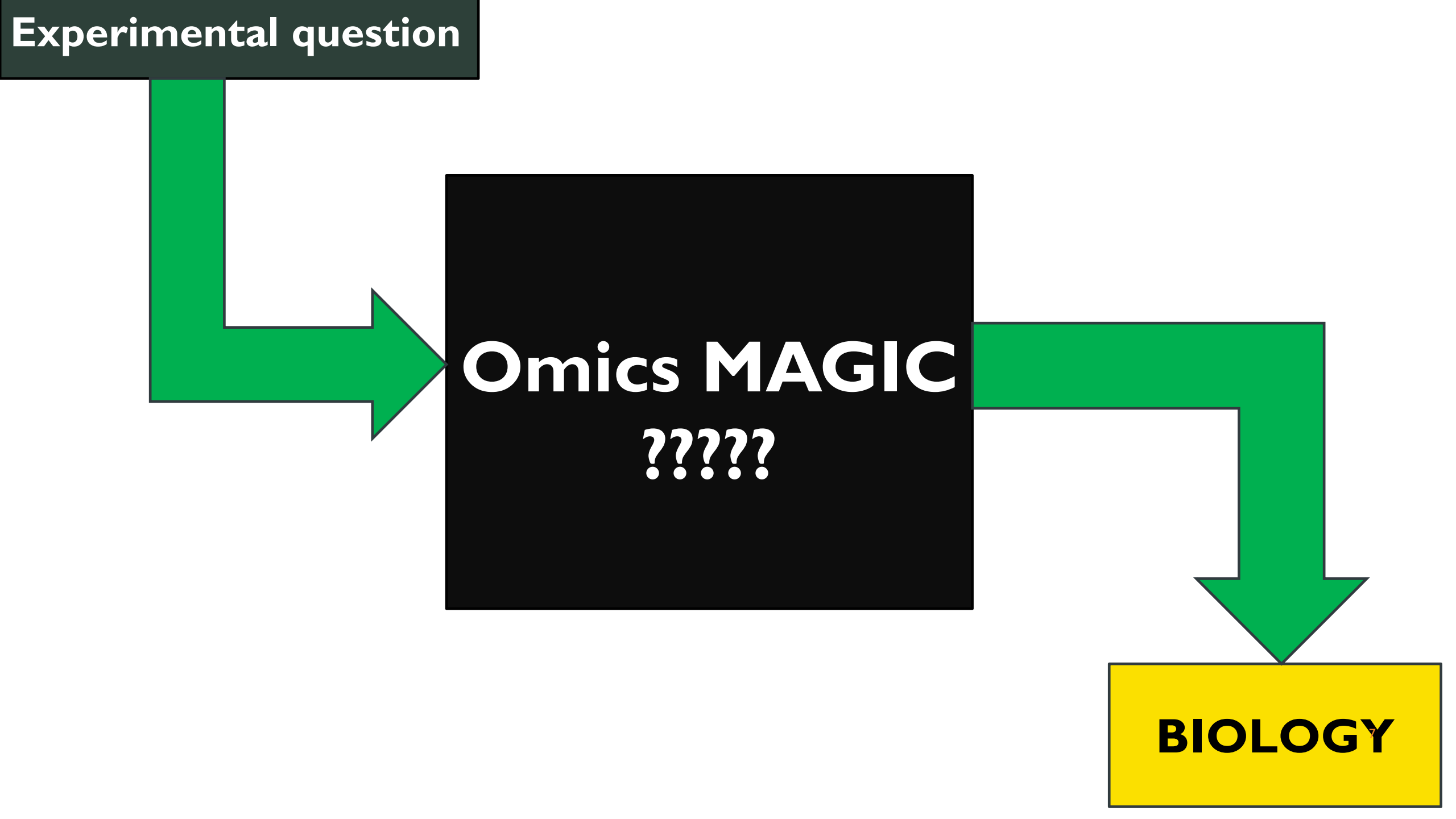
WORKSHOP STRUCTURE

CRASH COURSE!

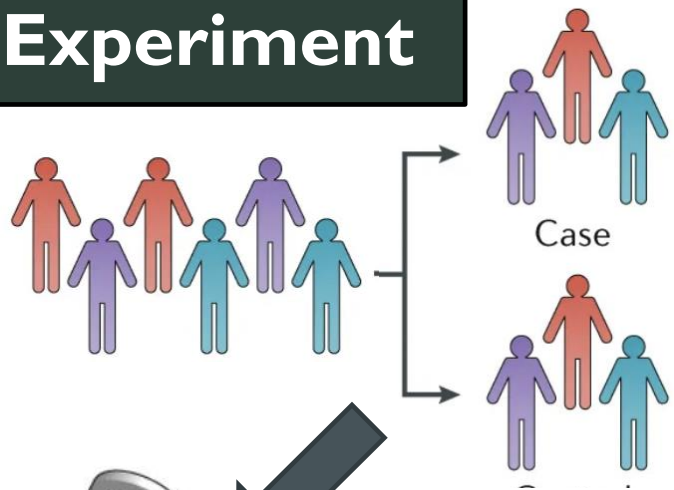
Hands-on training

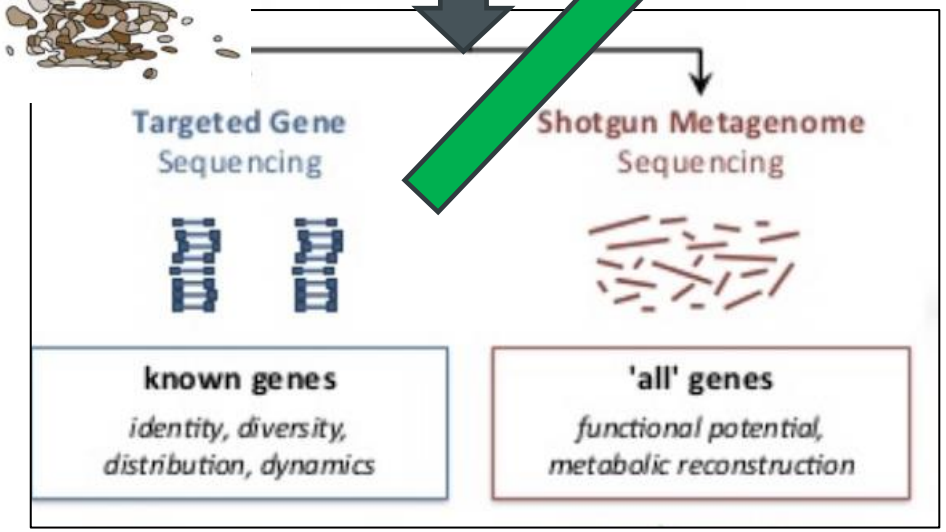
Wednesday	Thursday	Friday
Introduction to Microbiome Data Analysis	Taxonomic analysis Experimental Design	Taxonomic analysis Visualization
Computational methods + best practices for experimental design	Taxonomic analysis OTU/ASV Generation	Tataxonomic analysis Visualization

*Prior sequence analysis or command line experience are **not** required*


Experimental question
Omics MAGIC
?????
BIOLOGY

Experiment






```
>fasta sequence 1
CCGcAagCGATtCGTAGCGCGCTGGaCGTCTACGGCGAGAACGTCcGCAAGATCGTGCCC
ATCGACAGCCCGcAGTTCGGCCGCGTCACCTGCGTCtGCATCGGCGCGATGATGGTCGGT
AGCATCCACATGACCGTCGAGGAGGGCCAGCAGGTGAAGCGCGGCCAGgAGTTTGGGTAC
TTCGCTTTCGGTGGCTCGACGATCGTCGTGCTCTTCGAGAAGGGCGTCGTGCAGTGGGAC
GAGGACTTGCTGATCAACAGCCGCGCGTGCCTCGAGACTCTCGTGCGCGTCGGCATGGGT
ATCGGgcAcGGCAAaCGcAAGCCGAACACGGACGGTAGTAGTGCACAGTAGACGTCGGAT
cGACcGCCTTTcTGGtGTCATGTAGATACCTCGCGGAGTAGCCTACCcGGACCCTCCTA
ATAACGGACTTGTATGCAAACGTCCGCGCGGGTCCGCGACTACGTGCGCGGCGTGCCACG
>fasta sequence 2
GACCCcTCCCTtATCCTCTCCGCGTTCATCACTCtcGGTCCCCTCGGCCAAGGTGGCTTC
TCG   CGTCAACGGCCAGGACCTCTCTGAGATCCTGCCGCTGCATATGGGcGACGAG
T     CGTAGCTCTCGCGGGCCAGATGGTCTTCGCCGGGTGCTTCCTGGGCGCCTTC
      CTTCTCCCTTGGCGTCGCCTGGATTCTGCTGGCGATCATCTCCATCGGACACGTG
      GCCAGCTCACAGATTCCTTTCTCGATGGCGTACTGGGGCCTTATTTTCCCGAACGGG
TGTTCGCCCTCCTATGCGTGCagCTCGCGAAGGTGCTGGACAGTCCTGTcTTCAGGGCG
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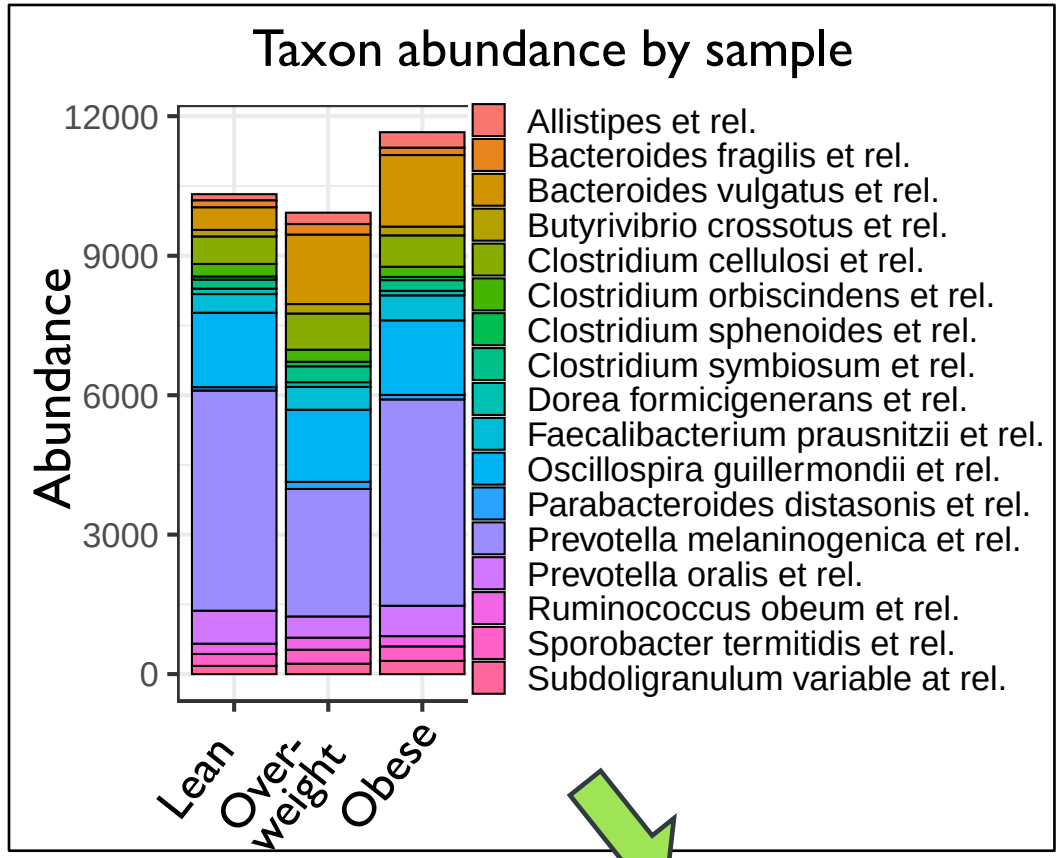


	Sample1	Sample2	Sample3
ASV_1	29	284	325476
ASV_2	16851	17521	34
ASV_3	0	0	0
ASV_4	26566	17	0
ASV_5	23225	19	0

genomes

linking phylogeny & function, genome diversification

BIOLOGY

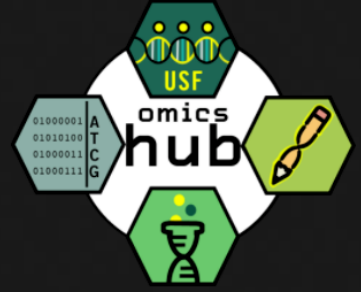
CONCEPTS

- EXPERIMENTAL DESIGN is paramount
- BEST PRACTICES
  - at the bench
  - at the computer
- Data-analyses
  - QUALITY CONTROL
  - APPROPRIATE analyses to apply to answer YOUR biological question
    - many different methods, stats to be considered
- Tutorials for biologists
  - we can't remove ALL the code
  - but focus = straightest path from data to biology/interpretation

HUB MICROBIOME WORKSHOP GITHUB PAGE

- Will go live tomorrow!
  - Workshop-materials
  - Walk-throughs
  - Resources

Special thanks: Janelle Donglasan



Microbiome Data-Analysis Workshop

GOAL

> In addition to understanding the importance of experimental design, we will walk through turning raw sequence data into useful counts data that we can use to visualize microbiome sample composition then discuss methods to extrapolate function from abundance data and ultimately arrive at biological insight.

Table of Contents

Pre course Materials

- Best Practices for Analyzing Microbiomes - This article discusses how all stages of conducting a microbiome study, from designing the experiment to collecting and storing the samples to obtaining insight from graphical displays of the sequence data, can substantially impact the result.

- If you do not have R and RStudio installed already, you can follow these instructions for both Mac and Windows. If you already have RStudio, make sure the lastest R version is 4.0.1 -- "See Things Now" by clicking on Global Options... in the Tools tab. The version is also stated in the first line of the console when you first open RStudio. Follow the previous link to get the new version then uninstall the old version from your computer.

You can copy the library with your old packages from the previous version to the new version then update the packages by clicking Check for Package Updates... also in the Tools tab within RStudio.

If you have Windows, then a very easy way to update your R version and packages is by simply running the following code in RStudio console:

```
install.packages("installr")

library(installr)
```

USF Genomics home page

USF HEALTH

College of Public Health

USF Genomics

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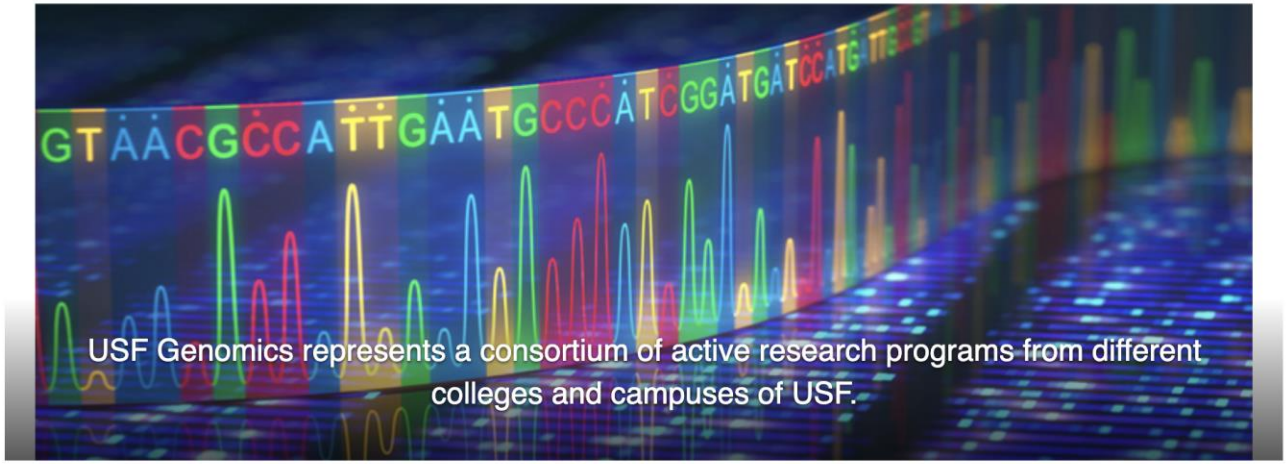
- Degree Programs
- Undergraduate Opportunities
- Annual Symposium
- College of Arts and Sciences News
- Genomics Training
- Request Services



About USF Genomics

Our projects integrate modern genomic approaches to understand and help develop solutions for some of the major challenges affecting global health and especially our Florida community. USF Genomics research projects are naturally interdisciplinary with studies that cross many boundaries of traditional scientific fields, integrating bioscience approaches in experimental and environmental research with computation biology. Opportunities exist for new graduate students to join well-funded research programs to study disease causes from underlying drug resistance and virulence genes in pathogenic organisms to changes of microbial communities within our bodies to the marine environment.

Register and Submit Abstracts for the USF Genomics Annual Symposium on November 15, 2019

Upcoming Events

USF Genomics Seminars: Tuesdays once a month, 4:00-5:00 pm - IDRB 302

USF Genomics Seminar - Dr. Maureen Groer - Microbiome State of the Science - Tuesday, September 17, 4:00-5:00 pm - IDRB 302

USF Genomics Forum Discussion Series - Tuesdays once a Month, 5:00-6:00 pm - IDRB 302

USF Genomics Annual Symposium: Personal Genomics - November 15, 2019

Genomics Laboratory and Data-Analysis Training Courses: February, May, September 2019

Full COPH Calendar

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UNIVERSITY OF SOUTH FLORIDA

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UNIVERSITY OF SOUTH FLORIDA

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COLLEGE OF MARINE SCIENCE

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ST. PETERSBURG

Your first contact for all Genomics Program inquiries

genomics@usf.edu