**R intensive using snail dynamics dataset**

Syllabus

September 2022

**Dates and Times**: 11-13 September 2022; 9am-12pm & 1pm-4pm

**Instructors:** Naima Starkloff Ph.D. (11-13 September), David Civitello Ph.D. (13 September)

**Contact**: [naima.starkloff@emory.edu](mailto:naima.starkloff@emory.edu), [david.james.civitello@emory.edu](mailto:david.james.civitello@emory.edu)

**Content**: This workshop will be a mix of short lectures and guided computer exercises. Participants will work through exercises in pairs and with the help of instructors. Each pair of participants will come up with scientific question to answer using the data, and the best idea has the potential to be pursued as a publication.

**Purpose**: Attendees of this workshop will learn to:

1. write basic code, read in datasets, utilize basic functions and subset datasets,
2. solve data problems and visualize data using functions in Tidyverse,
3. use new skills to answer a question of interest about the snail dynamics data.

**Expectations of participants in this Workshop:**

1. Learn computational skills that allow you to process a dataset and answer questions.
2. Participate in pairs to complete worksheets.
3. Come up with a scientific question in pairs that could be pursued as a publication.
4. Feel welcome to raise your hand and ask a question at any point.
5. Raise your hand to answer questions asked by instructor.

**Materials**: Participants will receive printed worksheets to help work through the content. These worksheetssheets, as well as the R scripts, syllabus and power point slides will all be available online on the workshop GitHub page: <https://github.com/naimastarkloff/RSnails>

**Schedule**:

**Day 1: write basic code, read in datasets, utilize basic functions and subset datasets**

* Introduction to the kinds of questions you can answer using R coding
  + Participants should start thinking about the kinds of questions they could pursue
  + Participants will works in pairs through the workshop and should discuss ideas of research questions
* Introduction to R programing language and the Rstudio application
  + Installation of both R and Rstudio
  + Discussion of benefits of using R
  + Review of 4 windows of Rstudio application
  + Quick statistics check in
* Exercises for basics in R
  + **Exercise 1**: Using R as a calculator
    - Learning basic coding and functions
  + **Exercise 2**: A year’s summary of Lambo la Mwabasabi
    - Assembling and exploring a small dataset
  + **Exercise 3**: Opening datasheets in R
    - Exporting and exploring datasheets in .csv format
  + **Exercise 4**: Subsetting datasets in R
    - Creating subsets to answer specific questions about the dataset
* Resources to help write code.

**Day 2: solve data problems and visualize data using R tools such in Tidyverse**

* Brief introduction to the aestivation
* Introduction to Tidyverse packages and how to install them
* Utilize the packages within Tidyverse to manage, clean, manipulate and visualize data
* Exercises to develop skills with Tidyverse packages
  + **Exercise 1**: Recap of subsetting and introduction to piping
    - Practice subsetting and use piping to perform a mathematical function
  + **Exercise 2**: Introduction to joining
    - Using joining tools to merge two datasets with columns in common
  + **Exercise 3**: Summary statistics
    - Using Tidyverse functions to summarize data
  + **Exercise 4**: Data cleaning & Management
    - Using Tidyverse functions to remove common errors and create new columns of interest
  + **Exercise 5**: Graphing with ggplot2
    - Creating visual representation of data

**Day 3: Use new skills to answer a question of interest about the Tanzania data (DAY 4)**

* Exercise to practice skills learned in previous days
* Brainstorming and discussion of questions that could be pursued with the data
* Working with partners to start assembling data
* Discuss potential avenues for research questions with Drs. Starkloff and Civitello
  + appropriate analyses to test question
  + Discussion of conclusions

**R resources:**

Find useful resources at the end of the worksheets for day 1 and 2.