Title: **Workshop on computational biology of infectious disease dynamics (Nov 9-10)**

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The goal of the workshop is to provide a two-day computer-intensive immersion in practical computations for biological dynamical systems using infectious disease outbreaks as the focus. Each section of the workshop will consist of abridged introductory remarks outlining the relevant basic biology and mathematics (mostly ODEs), followed by examples of practical implementation for computational analysis and epidemiological interpretation. The web repository is https://github.com/objornstad/UGAworkshop

Currently the three dominant programming platforms in this arena is R and Python. This workshop will use R as packaged through RStudio (https://posit.co/downloads/) which is an open source platform available to all operating systems. As moving along, the workshop will use some advanced computational acrobatics, so participants using own laptops (encouraged) or desktops should after installation open RStudio and go to "Tools -> Install packages" and then install "epimdr2" with all dependencies and "tinytex". We will be in computer room at 9:15 if troubleshooting is needed.

I scouted out the computers and it will take a bit of work before wheels-up, so be there promptly.

Tentative schedule is:

Thur 9

9:30-10:00   Getting settled in computer room.

10:00-10:30   The logic of the R language… It is a language with 6 items

10:30-11:00   The logic of infectious disease dynamics… It is a language with 3 compartments. Deriving the SIR model

11:00-11:45   A recipe for integrating ODEs. Piecing together an SIR ode integrator

Noon   Lunch

1:30-2:00   The closed epidemic. R0 vs pc.

2:00-2:45   Covid has loss of immunity. Parameterize and analyze the SIRS model.

2:45-3:00   Break

3:00-4:00   The reproduction number… rational and consequences… code a for loop of geometric Spread. The open epidemic S-bar versus R0 and strain replacement.

4:00-4:15   What y'all wonder about

Thur 10

9:00-9:30   Getting settled in computer room.

9:30-10:15   The reproduction number how to calculate using regression or logic (SEIR ex).

10:15-11:00   **Daniel Boakye**: Biology and epidemiology of vector bornes; Challenges of quantification, field validation of NTDs

11:00-11:15   Q&As so far

11:15-11:30   Break

11:30-12:00   Ross-MacDonald Malaria equations… Maths and coding

Noon   Lunch

1:30-2:15   The math, vector fields and code for the phase-plane

2:15-3:00   Stable and unstable equilibria. The Jacobian

3:00-3:15   Break

3:15-3:45   Interepidemic intervals

3:45-4:15   **Effah-Kaufman**: Reflections on maths, bioengineering and biology