QBioS Workshop
Epidemics
May 17-18, 2021

Joshua Weitz, JC Gumbart
& the Fall 2020 QBioS PhD Cohort

Workshop made possible with support from the Burroughs Wellcome Fund
Many thanks to Dr. Jessica Irons and Audra Davidson for their assistance with workshop coordination, development, and logistics.
Dashboard Development

Dr. Lavanya Rishishwar
Sr. Bioinformatics Scientist & Developer
IHRC, Inc.

Received his Bioinformatics PhD @ GT

Dr. Aroon Chande
Bioinformatics Scientist at Seattle Genetics & Scientific Advisor at ABiL.

Received his Bioinformatics PhD @ GT
Guest Instructors

Dr. Bradford Taylor
Harvard School
Public Health

Dr. Adriana Lucia-Sanz
GT-QBioS

Conan Zhao
GT-QBioS

Dr. Stephen Beckett
GT-BioSci

Pablo Bravo
GT-QBioS

Jeremy Harris
GT-BioSci

Marian Dominguez Mirazo
GT-QBioS

Andreea Magalie
GT-QBioS

Nolan English
GT-QBioS

Varun Sharma
GT-QBioS

Dr. David Demory
GT-BioSci
Context for Today’s Workshop
Foundations in Quantitative Biosciences

Offered Fall 2016-2020 (and again in 2021)
3 hrs of lecture + 3 hrs of lab

with textbook + lab guides coming soon(ish)

email: jsweitz@gatech.edu for more info on book
The overall objective of Foundations of Quantitative Biosciences is to teach students how to reason quantitatively in the biosciences given uncertainty in mechanisms, rates and reliability of measurements across scales from molecules to organisms to ecosystems.

aka

Yes you can do it!
## MONDAY, MAY 17

- **8:45** Welcome to the Workshop – Prof. [Joshua Weitz](mailto:joshua.weitz@biol.gatech.edu), School of Biological Sciences, Georgia Tech & Prof. [James C. Gumbart](mailto:james.gumbart@physics.gatech.edu), School of Physics, Georgia Tech
- **9:00** Plenary Lecture: Core principles behind infection and disease spread – Prof. [Sarah Cobey](mailto:sarah.cobey@uchicago.edu), Department of Ecology & Evolution, University of Chicago
- **10:00** Q&A
- **10:15** Break
- **10:30** Track 1: Introduction to programming
  - Track 2: Journal club discussion for more advanced programmers
- **12:00** Lunch Break
- **13:00** Hands-on Modeling Epidemics I: Deterministic Models
- **15:00** Wrap-up day 1

## TUESDAY, MAY 18

- **9:00** Lecture: Stochastic Modeling of Epidemics – Prof. [Joshua Weitz](mailto:joshua.weitz@biol.gatech.edu), School of Biological Sciences, Georgia Tech
- **10:00** Q&A
- **10:15** Break
- **10:30** Hands-on Modeling Epidemics II: Stochastic Models
- **12:00** Lunch Break
- **13:00** Introduction to Dashboards – Applied Bioinformatics Laboratory (ABIL)
- **13:30** Hands-on Dashboard Implementation: Epidemic dynamics
- **15:00** Survey (Lottery among all participants)
- **15:15** Break
- **15:30** Plenary Lecture – Prof. [Sam Scarpino](mailto:sam.scarpino@northeastern.edu), Network Science Institute, Northeastern University
- **16:30** Prize announcement of survey lottery
- **16:45** Closing thoughts
- **17:00** Workshop closes
### Schedule

**M O N D A Y, M A Y  1 7**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:45</td>
<td>Welcome to the Workshop – Prof. Joshua Weitz, School of Biological Sciences, Georgia Tech &amp; Prof. James C. Gumbart, School of Physics, Georgia Tech</td>
</tr>
<tr>
<td>9:00</td>
<td>Plenary Lecture – Core principles behind infection and disease spread – Prof. Sarah Cobey, Department of Ecology &amp; Evolution, University of Chicago</td>
</tr>
<tr>
<td>10:00</td>
<td>Q&amp;A</td>
</tr>
<tr>
<td>10:15</td>
<td>Break</td>
</tr>
<tr>
<td>10:30</td>
<td>Track 1: Introduction to programming</td>
</tr>
<tr>
<td></td>
<td>Track 2: Journal club discussion for more advanced programmers</td>
</tr>
<tr>
<td>12:00</td>
<td>Lunch Break</td>
</tr>
<tr>
<td>13:00</td>
<td>Hands-on Modeling Epidemics I: Deterministic Models</td>
</tr>
<tr>
<td>15:00</td>
<td>Wrap-up day 1</td>
</tr>
</tbody>
</table>

What’s going to happen next?

A plenary lecture + Q&A w/Prof. Sarah Cobey.

Then a short break.

Then, break-out rooms where our team of QBioS + guest instructors will guide the hands-on modeling activities.

Today, AM: Basics in coding and/or journal club. Today, PM: Deterministic models of epidemics.

Tomorrow, AM: Stochastic models of epidemics.

Each group is working in one language (Matlab, Python or R).

The guides are in pdf-s so you should **read**, **think**, **type** in code, **learn** from (purposeful) mistakes, **build** your own epidemic models, and **discover** new insights along the way.

workshop2021.qbios.gatech.edu
Plenary Speakers

Sarah Cobey

Associate Professor in Ecology and Evolution at the University of Chicago.

Monday May 17, 9am EDT
“Modeling COVID-19: what went wrong and right, and what’s next”

Sam Scarpino

Assistant Professor in the Network Science Institute at Northeastern University.

Tuesday May 18, 3:30pm EDT