

Session 3: Computational Modeling: “Predicting a Pandemic (from your own computer)”

- **Overview.**

- [LINK](#) to event outline, incl. discussion notes for mentors
- [LINK](#) to event slides
- In this session, the students took on the role of a public health researcher and used SIR models to understand the spread of a virus in a population and explore the effect of public health interventions.
- In preparation, the students were sent a Google Colab notebook ([LINK](#)) to familiarize themselves with this tool, and a YouTube video by Duane Nykamp on SIR models ([LINK](#)) for a first exposure to this concept.
- In this session:
 - We very briefly introduced the Hoffmann lab.
 - We explained the concept of SIR models and briefly introduced the form of the system of differential equations and rate parameters.
 - In 6 breakout rooms, 3-4 students worked with 1-2 lab members in Google Collab Python notebooks on adjusting parameters in a SIR model to show when the peak of infection is reached and what parameters that depends on ([NOTEBOOK VIRAL SPREAD](#)). Using adjusted model versions, each group also worked on answering a question about one of the public health interventions listed below. They prepared to briefly present the results to the rest of the group by compiling copied graphs of their simulation results in a PowerPoint slide or directly showing their CoLab notebook. The assumptions, limitations, and strength of the model were discussed.
 - Quarantining ([NOTEBOOK](#))
 - Lockdown ([NOTEBOOK](#))
 - Traveling ([NOTEBOOK](#))
 - Vaccination ([NOTEBOOK](#))
 - Back in the large group, the students shared the results of their analysis with the rest of the class.

- **Our Conclusions.**

- Half of the breakout groups found 1 hour to be a good amount of time to complete the basic SIR model exercise discussion questions as well as one of the public health intervention model exercises and discussion questions in the interactive notebook. The other breakout groups spent most of the time focused on the basic SIR model and felt rushed when trying to complete and discuss one of the public health intervention models.
- There was a wide range of background, interest, participation, and understanding among the students.
- Some students found the session too easy and others found it too difficult. Perhaps in the future we could break up students into groups based on their mathematical/computational backgrounds so that some groups could move faster while others focus on understanding the fundamentals.

- Sending the SIR video and introductory Google CoLab notebook to Dr. Shannon to discuss with the students in the class time before our meeting was helpful in introducing the concepts to the students.
- **Student Feedback.**
 - Slides of compiled responses ([LINK](#))