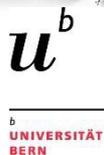


Swiss Epidemiology Winter School 2022



Infectious disease models and their use in the SARS-CoV-2 pandemic

31 March – 2 April 2022

Faculty

PD Dr. Christian L. Althaus, PhD

Dr. Julien Riou, PhD

Dr. Emma Hodcroft, PhD

Institute of Social and Preventive Medicine (ISPM), University of Bern, Switzerland

Prof Dr. Roland Regoes, PhD, ETH Zurich

Venue

CH – 3823 Wengen | SWITZERLAND

Hotel Edelweiss (see map on <https://www.epi-winterschool.org/course-hotel-locations/>)

Description

Infectious disease modeling has become a key tool for improving understanding about transmission and the potential impact of public health interventions, as illustrated during the SARS-CoV-2 pandemic. In this course, students will be introduced to the history and main concepts of mathematical modeling of infectious diseases such as compartmental models, the basic reproduction number R_0 , the effective reproduction number R_e , and the vaccination threshold. We will further study the application of Bayesian inference in infectious disease models and the use of genomic epidemiology to track the spread of viral variants. Finally, we will discuss how infectious disease models have shaped our understanding of the SARS-CoV-2 pandemic and influenced policy making. Exercises will be conducted in the programming languages R and Stan. Previous knowledge of R and Stan will be useful but is not essential.

Objectives

- To become familiar with the main concepts in infectious disease modeling
 - To use simple compartmental models to study infectious disease transmission
 - To understand the basic principles of Bayesian inference in infectious disease modeling
 - To understand the role of genomic epidemiology for research and public health
 - To learn how to critically assess the use of infectious modeling for policy making
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Target audience	PhD students, post-doctoral researchers, and public health officers who want to gain a basic understanding of infectious disease modelling and/or who are interested in the role of mathematical modelling during the SARS-CoV-2 pandemic.
Outline	<p>The course will run over three days and consists of lectures in the morning, and computer practical sessions and a workshop during the evening. During the extended break in the afternoon, participants review course materials, read papers, catch up on emails or go skiing.</p> <p><i>Thursday, 31 March (8:30 – 12:00 17:00 – 19:00)</i></p> <ul style="list-style-type: none"> • History of infectious disease modeling • Compartmental models • Computer practical: Modeling an influenza epidemic <p><i>Friday, 01 April (8:30 – 12:00 17:00 – 19:00)</i></p> <ul style="list-style-type: none"> • Bayesian inference with Stan • Fitting and diagnosing an SIR model in Stan • Computer practical: Modeling SARS-CoV-2 in Switzerland <p><i>Saturday, 02 April (8:30 – 12:00 16:00 – 18:00)</i></p> <ul style="list-style-type: none"> • Real-time tracking for real-time pandemics • Infectious disease modeling during the SARS-CoV-2 pandemic • Workshop: How to use infectious disease modeling for policy making
Credits	1.0 ECTS
To bring along	Students will bring their own laptops with installed versions of RStudio (http://www.rstudio.com) and RStan (https://mc-stan.org/users/interfaces/rstan.html). University of Bern IT staff will be on site and can provide help upon request per e-mail (it@ispm.unibe.ch).
Course fee	SSPH+ students: CHF 700 Academic: CHF 900 Industry: CHF 2000
Registration	You can register on the Winter School website www.epi-winterschool.org .
Accommodation	Participants must book their accommodations themselves. Please see our recommendations on https://www.epi-winterschool.org/course-hotel-locations/ for special prices.