Swiss Epidemiology Winter School 2022

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

17 – 19 January 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
Venue	**CH – 3823 Wengen | SWITZERLAND** Hotel Sunstar (see map on http://www.epi-winterschool.org/hotels)
Description	Infectious disease modelling 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 modelling 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 language R. Previous knowledge of R will be useful but is not essential.
Objectives	• To understand the role of infectious disease dynamics for research and health care • To become familiar with the main concepts in infectious disease modelling • To use simple and advanced mathematical models to study disease transmission and control interventions, with a focus on SARS-CoV-2.

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Target audience	PhD students and post-doctoral researchers 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	The course will run over three days and consists of lectures in the morning and computer practical sessions during the evening. During the extended break in the afternoon, participants review course materials, read papers, catch up on emails or go skiing. ***Monday, 17 January (8:00 – 12:00 | 16:30 – 18:30)*** • History of Infectious disease modelling • Compartmental models ***Tuesday, 18 January (8:00 – 12:00 | 16:30 – 18:30)*** • Bayesian workflow for disease transmission modelling ***Wednesday, 19 January (8:00 – 12:00 | 16:30 – 18:30)*** • Genomic epidemiology: Real-time tracking for real-time epidemics • Infectious disease modelling during the SARS-CoV-2 pandemic
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 www.epi-winterschool.org/hotels for special prices.

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