

# CMPD6 abstracts

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## List of abstracts

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### **Azmy Ackleh - A Multiple-Strain Susceptible-Infected Model with Diffusion Formulated on the Space of Radon Measures**

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University of Louisiana at Lafayette  
USA

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Minisymposium presentation  
(Ecological and Epidemiological Models with Dispersal)

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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### **Folashade Augusto - Exploring the effects of prescribed fire and rising temperature on tick-borne diseases**

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University of Kansas  
USA

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Minisymposium presentation  
(Vector-Borne Disease Dynamics)

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## **Folashade Augusto - From cultural practices to risky behaviors to public sentiment: Modeling human behavior and disease transmission**

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University of Kansas  
USA

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Plenary presentation

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## **Ephraim Agyingi - Modeling immune system priming: the miracle that saved Sub-Sahara Africa from COVID-19**

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Rochester Institute of Technology, Rochester, New York  
USA

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Minisymposium presentation  
(Within-host and between-host mathematical models of biological dynamics)

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Vitalii Akimenko - Numerical Method for the Age-structured SIPCVC Epidemic Model of Healthy cells, Dysplasia, Cervical Cancer Cells and HPV Dynamics**

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University of Manitoba  
Canada

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Contributed presentation

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## **Asami Anzai - Estimating importation cases using mobility data**

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Kyoto University  
Japan

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Minisymposium presentation  
(Real time epidemiology in various geographic scales)

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Julien Arino - Role of case introductions in the community spread of infectious diseases**

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University of Manitoba  
Canada

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Joseph Baafi - Modelling the Impact of Seasonality on Mosquito Population Dynamics: Insights for Vector Control Strategies.**

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Memorial University of Newfoundland  
Canada

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Contributed presentation

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Rebecca Bekker - Black Holes in TIME: the Effect of GRID Radiation on the Tumor-Immune Micro-environment**

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H. Lee Moffitt Cancer Center and Research Institute  
USA

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Minisymposium presentation  
(Within-host and between-host mathematical models of biological dynamics)

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Ranjini Bhattacharya - Angiogenesis in Cancer: A Tragedy of Commons**

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Moffitt Cancer Center  
USA

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Contributed presentation

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Amanda Bleichrodt - Multi-model forecasts in the context of the Mpox outbreak in multiple countries (July 28th, 2022 through January 26th, 2023)**

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Georgia State University  
USA

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Minisymposium presentation  
(Real time epidemiology in various geographic scales)

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Anuraag Bukkuri - Models of Resistance in State-Structured Cancer Populations**

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Moffitt Cancer Center and Lund University  
USA

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Contributed presentation

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## **Jacques Bélair - Population models with state-dependant delays**

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Université de Montréal  
Canada

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Minisymposium presentation  
(Delay-differential equations in applications)

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## **Jacques Bélair - Modeling the use of Fangsang Shelter Hospitals in Wuhan**

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Université de Montréal  
Canada

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Robert Stephen Cantrell - Resource Matching in Spatial Ecology and Evolutionary Advantage**

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University of Miami  
USA

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Minisymposium presentation  
(Ecological and Epidemiological Models with Dispersal)

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Fabian Cardozo-Ojeda - Mathematical modeling of gene and cell therapy for HIV cure**

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Fred Hutchinson Cancer Center  
USA

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Minisymposium presentation  
(Multiscale models of infectious diseases)

---

Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Bernard Cazelles - Modeling infectious disease dynamics: the challenge of non-stationarity**

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Sorbonne Université  
France

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Contributed presentation

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Stanca Ciupe - Multiscale models of SARS-CoV-2 infection**

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Virginia Tech  
USA

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Minisymposium presentation  
(Multiscale models of infectious diseases)

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Adriana-Stefania Ciupeanu - Dynamics of COVID-19 Variants of Concern**

---

University of Manitoba  
Canada

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---

Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Jessica Conway - Heterogeneity in HIV viral rebound**

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Penn State  
USA

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Minisymposium presentation  
(Mathematical and computational approaches to modelling immunology)

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## **Jessica Conway - Modeling PrEP-on-demand strategies to prevent HIV transmission**

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Penn State  
USA

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Minisymposium presentation  
(Multiscale models of infectious diseases)

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Morgan Craig - Delays in the cell cycle: implications in immune responses**

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Sainte-Justine University Hospital Research Centre / Université de Montréal  
Canada

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Minisymposium presentation  
(Delay-differential equations in applications)

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## **Morgan Craig - The TME determines the efficacy of immunotherapies to treat glioblastoma**

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Sainte-Justine University Hospital Research Centre / Université de Montréal  
Canada

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Minisymposium presentation  
(Modelling the Cancer Microenvironment)

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## **Jim Cushing - Discrete-time models of infectious diseases: a project in memory of Aziz-Abdul Yakubu**

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University of Arizona  
USA

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Plenary presentation

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## **Tanuja Das - An eclipse-phase lag drives oscillations in a viral infection model with a general growth function**

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University of New Brunswick, New Brunswick  
Canada

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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## **Tanuja Das - Effect of a novel generalized incidence rate function in SIR model: stability switches and bifurcations**

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University of New Brunswick, New Brunswick  
Canada

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Contributed presentation

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Xiaoyan Deng - Predicting heterogeneous CD8+ immune memory responses in COVID-19 using a virtual patient cohort**

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Université de Montréal  
Canada

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Minisymposium presentation  
(Within-host and between-host mathematical models of biological dynamics)

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## **Clotilde Djuikem - Impulsive modelling of rust dynamics and predator releases**

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Université Côte d'Azur, Inria, INRAE, CNRS, Université Paris Sorbonne, BIOCORE, France  
France

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Contributed presentation

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## **Marisa Eisenberg - Models to inform wastewater-based epidemiology: identifiability, uncertainty, and opportunities**

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University of Michigan, Ann Arbor  
USA

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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## **Marisa Eisenberg - Identifiability and infectious disease interventions: exploring when uncertainty matters**

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University of Michigan, Ann Arbor  
USA

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Plenary presentation

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## **Blessing Emerenini - Data Assimilation of Quorum Sensing Regulation of Bacteria-Phage Interaction in Biofilm**

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Rochester Institute of Technology  
USA

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Minisymposium presentation  
(Within-host and between-host mathematical models of biological dynamics)

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## **Guihong Fan - Delayed model for the transmission and control of COVID-19 with Fangcang Shelter Hospitals**

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Columbus State University  
USA

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Minisymposium presentation  
(Delay-differential equations in applications)

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## **Suzan Farhang-Sardroodi - Mathematical model of muscle wasting in cancer cachexia incorporated with immunology**

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Department of Mathematics, university of Manitoba  
Canada

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Minisymposium presentation  
(Mathematical and computational approaches to modelling immunology)

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## **Suzan Farhang-Sardroodi - Mathematical Modelling of the Impact of Human Immune Diversity on COVID-19 transmission**

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Department of Mathematics, university of Manitoba  
Canada

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Minisymposium presentation  
(Multiscale models of infectious diseases)

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## **Jonathan Forde - Modeling the challenges of optimal resource deployment for epidemic prevention**

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Hobart and William Smith Colleges  
USA

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Minisymposium presentation  
(Multiscale models of infectious diseases)

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## **Samaneh Gholami - Mathematical Modeling of Immune Response to Protein Subunit COVID-19 Vaccines**

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York University  
Canada

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Minisymposium presentation  
(Within-host and between-host mathematical models of biological dynamics)

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## **Abba Gumel - Mathematical Assessment of the Role of Pre-Exposure Prophylaxis on the HIV Pandemic**

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University of Maryland  
USA

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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## **Abba Gumel - Mathematics of Wolbachia-based biocontrol of mosquito-borne diseases**

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University of Maryland  
USA

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Minisymposium presentation  
(Vector-Borne Disease Dynamics)

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## **Donglin Han - Retrospective estimation of proportion of total infections of COVID-19 during the first wave in Alberta**

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University of Alberta  
Canada

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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## **Katsuma Hayashi - Reconstructing the temporal dynamics of clustering from cluster surveillance of COVID-19**

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Kyoto University  
Japan

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Minisymposium presentation  
(Real time epidemiology in various geographic scales)

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## **Jane Heffernan - Seasonality and Influenza pH1N12009 Vaccination Impact**

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York University  
Canada

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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## **Jane Heffernan - Modelling Immunity to SARS-CoV-2**

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York University  
Canada

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Plenary presentation

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## **Esteban A. Hernandez-Vargas - The Shapes of Immunological Data during Respiratory Infections**

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University of Idaho  
USA

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Plenary presentation

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## **Sarafa Iyaniwura - Understanding the efficacy of capsid protein allosteric modulators using a multiscale model of hepatitis B virus**

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Los Alamos National Laboratory  
USA

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Minisymposium presentation  
(Within-host and between-host mathematical models of biological dynamics)

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## **Sana Jahedi - Addressing Waning Immunity Against Measles: Reevaluating the MMR Vaccination Program**

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McMaster University, Biology department  
Canada

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Minisymposium presentation  
(Mathematical and computational approaches to modelling immunology)

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## **Harsh Vardhan Jain - A quantitative evaluation of an anti-cancer vaccine for treating advanced prostate cancer**

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Department of Mathematics and Statistics, University of Minnesota Duluth  
USA

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Minisymposium presentation  
(Mathematical modeling and analysis in cancer immunotherapy)

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## **Marek Kimmel - Site frequency spectra and estimation of clonal dynamics of tumors**

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Departments of Statistics and Bioengineering, Rice University  
USA

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Minisymposium presentation  
(Stochastic population models: Theory and applications in Cancer Research)

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## **Jude Kong - Mpox dynamic model: incorporating adaptive behavioural changes, different control strategies in the MSM community & under-reporting**

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York University  
Canada

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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## **Jude Kong - Leveraging mathematical models to support early management of an emerging disease outbreak: the case of Covid-19 and Africa**

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York University  
Canada

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Minisymposium presentation  
(Within-host and between-host mathematical models of biological dynamics)

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## **Chapin Korosec - Longitudinal immunological outcomes from three doses of COVID-19 vaccines in people living with HIV: antibodies, memory-B cells, cytokines, and a novel within-host immunological model**

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York University  
Canada

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Minisymposium presentation  
(Mathematical and computational approaches to modelling immunology)

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## **Christopher Kribs - Impact of tetravalent dengue vaccination with screening, ADE, and altered infectivity on dengue and Zika transmission**

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University of Texas at Arlington  
USA

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Minisymposium presentation  
(Vector-Borne Disease Dynamics)

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## **Furkan Kurtoglu - Modeling Colorectal Cancer Spheroids using Agent-Based Modeling Including Metabolism**

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Indiana University  
USA

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Minisymposium presentation  
(Modelling the Cancer Microenvironment)

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## **Brandon Legried - Inferring phylogenetic birth-death models from extant lineages through time**

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Georgia Institute of Technology - School of Mathematics  
USA

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Minisymposium presentation  
(Stochastic population models: Theory and applications in Cancer Research)

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## **Kang-Ling Liao - The opposite functions and treatment outcomes of CD200-CD200R in cancer**

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Mathematics, University of Manitoba  
Canada

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Minisymposium presentation  
(Mathematical modeling and analysis in cancer immunotherapy)

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Ernesto Lima - Development and calibration of a stochastic, multiscale agent-based model for predicting tumor and vasculature growth**

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The University of Texas at Austin  
USA

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Minisymposium presentation  
(Modelling the Cancer Microenvironment)

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## **Xiaochen Long - A Branching Process Model of Clonal Hematopoiesis**

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Rice University  
USA

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Minisymposium presentation  
(Stochastic population models: Theory and applications in Cancer Research)

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## **Loïc Louison - A Population Harvesting Model with Time and size Competition Dependence Function**

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Université de Guyane  
France

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Contributed presentation

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## **Nadia Loy - A non-local kinetic model for cell migration : a study of the interplay between contact guidance and steric hindrance**

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Politecnico di Torino  
Italy

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Minisymposium presentation  
(Modelling the Cancer Microenvironment)

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## **Chinwendu Emilian Madubueze - Modelling transmission dynamics of Lassa fever transmission with two environmental pathway transmissions**

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York university Toronto, Ontario  
Canada

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Contributed presentation

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## **Anna Marciniak-Czochra - Evolution of stem cell populations: Mechanistic mathematical modelling vs single cell data**

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Heidelberg University  
Germany

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Plenary presentation

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## **Fabio Milner - A mosquito-bird-human model for West Nile virus disease transmission**

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Arizona State University  
USA

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Minisymposium presentation  
(Vector-Borne Disease Dynamics)

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Jemal Mohammed-Awel - Mathematics model for assessing the impacts of pyrethroid resistance and temperature on population abundance of malaria mosquitoes**

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Morgan State University  
USA

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Minisymposium presentation  
(Vector-Borne Disease Dynamics)

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## **Nicola Mulberry - A nested model for pneumococcal population dynamics**

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Simon Fraser University  
Canada

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Minisymposium presentation  
(Bridging the scale from within-host to epidemic models)

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## **Toshiyuki Namba - Unexpected coexistence and extinction in an intraguild predation system**

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Osaka Metropolitan University  
Japan

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Contributed presentation

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## **Jay Newby - Dynamic self organization and microscale fluid properties of nucleoplasm**

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University of Alberta  
Canada

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Plenary presentation

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## **Hiroshi Nishiura - Night-time population consistently explains the transmission dynamics of coronavirus disease 2019 in three megacities in Japan**

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Kyoto University  
Japan

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Minisymposium presentation  
(Real time epidemiology in various geographic scales)

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## **Ryo Oizumi - Analytical Representation of Eigensystem in Multiregional Leslie Matrix Model: Application to Sensitivity Analysis of Population Declining in Japan**

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National Institute of Population and Social Security Research  
Japan

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Contributed presentation

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## **Lorenzo Pellis - Multi-scale time-since-infection models in evolutionary epidemiology**

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The University of Manchester  
UK

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Minisymposium presentation  
(Bridging the scale from within-host to epidemic models)

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## **Tin Phan - Modeling the emergence of viral resistance in SARS-CoV-2 patients treated with an anti-spike monoclonal antibody**

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Los Alamos National Laboratory  
USA

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Minisymposium presentation  
(Mathematical and computational approaches to modelling immunology)

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## **Tin Phan - Integrating wastewater surveillance data with epidemic models: challenges and opportunities**

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Los Alamos National Laboratory  
USA

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Minisymposium presentation  
(Multiscale models of infectious diseases)

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## **Tanya Philippsen - A retrospective modelling analysis of the effect of control measures on the transmission of SARS-CoV-2 in Canada**

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University of Victoria  
Canada

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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## **Andrea Pugliese - Combining data from surveillance on mosquitoes and corvids to understand the factors affecting the dynamics of West Nile Virus in Emilia-Romagna, Italy**

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Dept. of Mathematics, University of Trento  
Italy

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Minisymposium presentation  
(Vector-Borne Disease Dynamics)

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## **Erica Rutter - Modeling and Estimating Intratumoral Heterogeneity in Cancer**

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University of California, Merced  
USA

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Minisymposium presentation  
(Modelling the Cancer Microenvironment)

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## **Erica Rutter - Global Sensitivity Analysis of a Structured Model of COVID-19 Transmission on a College Campus**

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University of California, Merced  
USA

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Minisymposium presentation  
(Multiscale models of infectious diseases)

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## **Paul Salceanu - Robust uniform persistence for structured models of delay differential equations**

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University of Louisiana at Lafayette  
USA

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Minisymposium presentation  
(Ecological and Epidemiological Models with Dispersal)

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## **Leili Shahriyari - Digital twins of cancer patients: a step toward personalized treatments**

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Department of Mathematics & Statistics, University of Massachusetts Amherst  
USA

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Minisymposium presentation  
(Mathematical modeling and analysis in cancer immunotherapy)

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## **Zhisheng Shuai - Heterogeneity and Aggregation in Modeling Infectious Diseases**

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University of Central Florida  
USA

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Plenary presentation

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## **Nourridine Siewe - TGF-beta inhibition can overcome cancer primary resistance to PD-1 blockade: a mathematical model**

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Rochester Institute of Technology  
USA

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Minisymposium presentation  
(Mathematical modeling and analysis in cancer immunotherapy)

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## **Nourridine Siewe - Increase Hemoglobin Level in Severe Malarial Anemia while Controlling Parasitemia: A Mathematical Model**

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Rochester Institute of Technology  
USA

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Minisymposium presentation  
(Vector-Borne Disease Dynamics)

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## **Nourridine Siewe - Breast cancer exosomal microRNAs facilitate pre-metastatic niche formation in the bone: A mathematical model**

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Rochester Institute of Technology  
USA

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Minisymposium presentation  
(Within-host and between-host mathematical models of biological dynamics)

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## **Stacey Smith? - Coupling the within-host process and between-host transmission of COVID-19 suggests vaccination and school closures are critical**

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The University of Ottawa  
Canada

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Minisymposium presentation  
(Multiscale models of infectious diseases)

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## **Tracy Stepien - Deciphering Glioma Microenvironment Entry Mechanisms of Myeloid-Derived Suppressor Cells**

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University of Florida  
USA

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Minisymposium presentation  
(Modelling the Cancer Microenvironment)

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## **Yasuhiro Takeuchi - Stability analysis of a single-species logistic model with time delay and constant inflow**

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Aoyama Gakuin University  
Japan

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Contributed presentation

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## **Ryan Thiessen - Travelling waves of a new glioma invasion model**

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University of Alberta  
Canada

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Minisymposium presentation  
(Modelling the Cancer Microenvironment)

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## **Necibe Tuncer - Determining Reliable Parameter Estimates for Within-host and Within-vector models of Zika Virus**

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Florida Atlantic University  
USA

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Minisymposium presentation  
(Vector-Borne Disease Dynamics)

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## **Necibe Tuncer - Immuno-epidemiological co-action model of HIV infection and opioid addiction**

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Florida Atlantic University  
USA

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Minisymposium presentation  
(Within-host and between-host mathematical models of biological dynamics)

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## **Sonja Türpitz - Considering Subpopulations in Modelling Facultative Mutualism Reveals a New Approach to Model Interspecific Interactions**

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Friedrich Schiller University Jena, Germany  
Germany

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Contributed presentation

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## **Marie Betsy Varughese - Incorporating Health Seeking Behaviour in a Deterministic Model for Influenza**

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University of Alberta  
USA

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Jorge Velasco-Hernandez - Modeling a traffic light warning system for acute respiratory infections**

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Universidad nacional Autónoma de México  
Mexico

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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## **Jorge Velasco-Hernandez - The Ross-Mcdonald model revisited: linking transmission and within-host dynamics**

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Universidad nacional Autónoma de México  
Mexico

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Minisymposium presentation  
(Vector-Borne Disease Dynamics)

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## **Amy Veprauskas - The interplay between dispersal and Allee effects in discrete-time population models**

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University of Louisiana at Lafayette  
USA

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Minisymposium presentation  
(Ecological and Epidemiological Models with Dispersal)

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## **Amy Veprauskas - Pathogen dynamic in a tick-host system: A discrete-time modeling approach**

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University of Louisiana at Lafayette  
USA

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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## **Ren-Yi Wang - Analysis of A Countable-Type Branching Process Model for the Tug-of-War Cancer Cell Dynamics**

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Rice University  
USA

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Minisymposium presentation  
(Stochastic population models: Theory and applications in Cancer Research)

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## **Xuyuan Wang - Detecting and Resolving Nonidentifiability In Infectious Diseases Modeling**

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University of Alberta  
Canada

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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## **Kathleen Wilkie - Modelling the Evolution of the Immune Response to Cancer**

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Toronto Metropolitan University  
Canada

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Minisymposium presentation  
(Mathematical and computational approaches to modelling immunology)

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Mathematical modelling is an important tool for understanding and controlling the spread of infectious diseases. Heterogeneity, which refers to differences in factors such as demographics, behaviour, susceptibility, infectiousness, and disease severity within a population, plays a critical role in disease transmission and control. Incorporating heterogeneity into models can help researchers better understand disease spread across subpopulations and design more targeted control strategies. However, heterogeneous models can be high-dimensional and complex, leading to theoretical challenges in modelling analysis. Moreover, data collections in the field are often in the forms of aggregation, making modeling implementation challenging. In this talk, we will discuss recent developments and remaining challenges in modeling infectious diseases with a focus on heterogeneity and aggregation. The goal is to provide attendees with valuable insights into the significance of incorporating heterogeneity into models and effective ways to address associated challenges.

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## **Kathleen Wilkie - Modelling Radiation Cancer Treatment with Ordinary and Fractional Differential Equations**

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Toronto Metropolitan University  
Canada

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Minisymposium presentation  
(Modelling the Cancer Microenvironment)

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## **Pei Yuan - Modelling for informing public health policy on prevention and control of COVID-19 epidemics in Toronto, Canada**

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York University  
Canada

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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## **Veronika Zarnitsyna - Competing Heterogeneities in Vaccine Effectiveness Estimation**

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Department of Microbiology and Immunology, Emory University School of Medicine  
USA

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Minisymposium presentation  
(Bridging the scale from within-host to epidemic models)

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## **Huaiping Zhu - A two-stage model with distributed delay for mosquito population dynamics**

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York University  
Canada

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Minisymposium presentation  
(Delay-differential equations in applications)

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## **Huaiping Zhu - Modelling Study for the Control and Prevention of Brucellosis in Xingan League of China**

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York University  
Canada

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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## **Huaiping Zhu - Predictive modelling and forecasting of the mosquito abundance and risk of West Nile virus in Ontario Canada**

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York University  
Canada

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Minisymposium presentation  
(Vector-Borne Disease Dynamics)

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## **Pauline van den Driessche - Disease-Induced Hydra Effect**

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University of Victoria, BC  
Canada

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Minisymposium presentation  
(Recent Advances in Modelling Infectious Diseases)

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