



Mathematical Biology Seminar

Monday, January 8, 2024

3 pm MDT - 457 CAB (in person)

Join Zoom Meeting

<https://ualberta-ca.zoom.us/j/98497695684?pwd=SG5pcUVR50xucW5xd0xBTm1VVc0tEUT09>

Meeting ID: 984 9769 5684

Passcode: 32123



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Integrated statistical and network-based frameworks for studying ecological and biological complex systems

Together with climate change, the increase in anthropogenic and natural disturbances affects the environmental conditions of an ecosystem and thus can cause a pronounced change in its functionality. It, therefore, becomes critical to have an overview of how changes in a forest landscape will influence the spatial distribution of animals. In the first part of the talk, we present a machine learning framework to (1) study the expected long-term variations in animal assemblages following modifications in forest management, (2) quantify two climate-induced pathways based on direct and indirect effects on species occurrence under different forest harvest management scenarios and determine the main drivers of assemblage dissimilarity and (3) assess the effectiveness of threatened boreal caribou as an umbrella species for animals conservation under global change. In the second part of the talk, we will present a combined co-occurrence network analysis with species distribution models to analyze the effectiveness of the indicator species (IS) in reconstructing the biodiversity along latitudinal networks (LN). In our approach, we predict the occurrence of species based on (1) their conditional occurrence probability with IS and (2) the occurrence probability of IS. This methodology enables us to analyze the performance of the IS in recovering assemblages occurrence, emphasize how the LN will alter the interspecific interactions and how the composition of IS will change along LN.

COLLABORATIVE MATHEMATICAL BIOLOGY GROUP

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