



## PacTrans Doctoral Webinar Series – Fiete Krutein

Monday, December 12<sup>th</sup>, 2022, 10:00 AM Pacific Time

### Title: Optimization Modeling Approaches to Evacuations of Isolated Communities

**Abstract:** Isolated communities are particularly vulnerable to disasters caused by natural hazards. In many cases, evacuation is the only option to ensure the population's safety. However, the large body of existing research on evacuation modeling usually considers environments where populations can evacuate via private vehicles and by using an existing road infrastructure. These models are often not applicable to remote valleys and islands, where road connections can be disrupted or do not exist at all. The use of external resources is therefore essential to evacuate the population. This work addresses this knowledge gap by designing a new routing problem called the Isolated Community Evacuation Problem (ICEP) that optimally routes recovery resources between evacuation pick-up points and shelter locations to minimize the total evacuation time. The research presents derivations of the initial model for (a) emergency planning and (b) response purposes to give emergency planners and researchers tools to prepare for and react to an evacuation of an isolated community. An in-depth, real-world case study was conducted in collaboration with first responders and emergency authorities on Bowen Island in Canada is presented to test the applicability of the proposed models. This collaboration demonstrates the potential of full integration of the research with local emergency expertise from the area and highlights the data requirements that need to be met to maximize the use of the model.

### Webinar Registration Link

<https://washington.zoom.us/meeting/register/tJ0kdeqorzMrHdDnlljk-E9eH0Kw5T4wcLiu>



**Presenter Bio:** KLAAS FIETE KRUTEIN is an Operations Research Scientist at Convoy where he works on truck routing solutions that increase efficiency and sustainability in the logistics sector. He holds a Ph.D. and M.S. awarded by the Department of Industrial & Systems Engineering at the University of Washington. His research interests include optimization under uncertainty, global optimization, combinatorial optimization, vehicle routing, and applications of data-driven optimization and simulation techniques in logistic and supply chains. He was a member of the UW Supply Chain Transportation & Logistics Center where he did research on urban freight solutions and isolated community evacuations.

**Advisors: Professor Anne Goodchild and Professor Linda Ng Boyle**

*About PacTrans Doctoral Webinar Series: The Series will showcase important/promising doctoral research in the Pacific Northwest and beyond. PacTrans' objective is to encourage the early diffusion of innovative research and discussion among and across schools. We are aiming to hold the webinars 3-4 times per year, in early March, May, early October or November (considering that PacTrans yearly conference takes place in October).*

