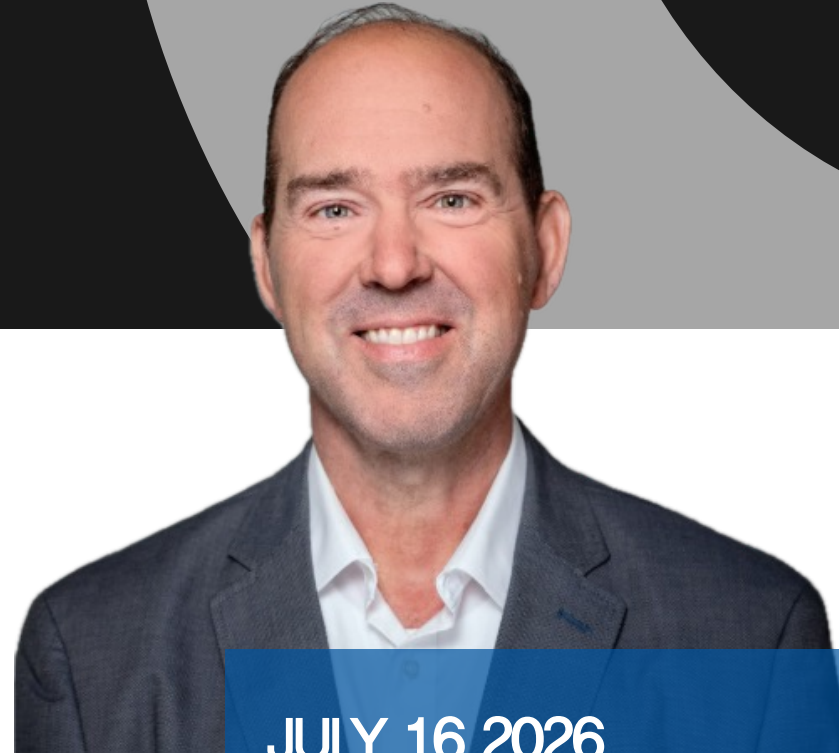


CAU

# Distinguished Statistics Lecture Series

## Richard J. Cook

University Professor  
Department of Actuarial Science  
and Statistics  
University of Waterloo



JULY 16 2026

2:00 – 3:00 PM

Rm. 413, 310 Building

### Advanced Assessing the Effects of Interventions in Life History Processes Using Observational Data

Real-world observational studies and administrative data are viewed as a rich source of information on disease processes and associated intervention effects. The validity of findings from the analysis of such data depends critically on addressing sources of observation bias and confounding related to treatment by indication. Furthermore, disease and related features are dynamic processes where changes in disease states, markers, and treatment occur at random times that may not be fully observed. We consider challenges arising from the analysis of data on such processes, motivated in part by a cohort of persons with psoriatic arthritis whose clinic visits occur at random times associated with the disease and treatment processes. Through the formulation of joint multistate models for disease, biomarker and treatment processes we address confounding by indication, while an expanded model addresses possible biases arising from a disease-related visit process. We use this framework to specify and estimate average treatment effects in a corresponding conceptualized experimental regime through trial emulation. We illustrate our methodology on the psoriatic arthritis cohort and estimate an average effect of biologic versus conventional therapy on the progression of joint damage over time. This is joint work with Jerry Lawless and Lily Zou.