Chemical & Physical Sciences
UNIVERSITY OF TORONTO
MISSISSAUGA

Colloquium Seminar Series
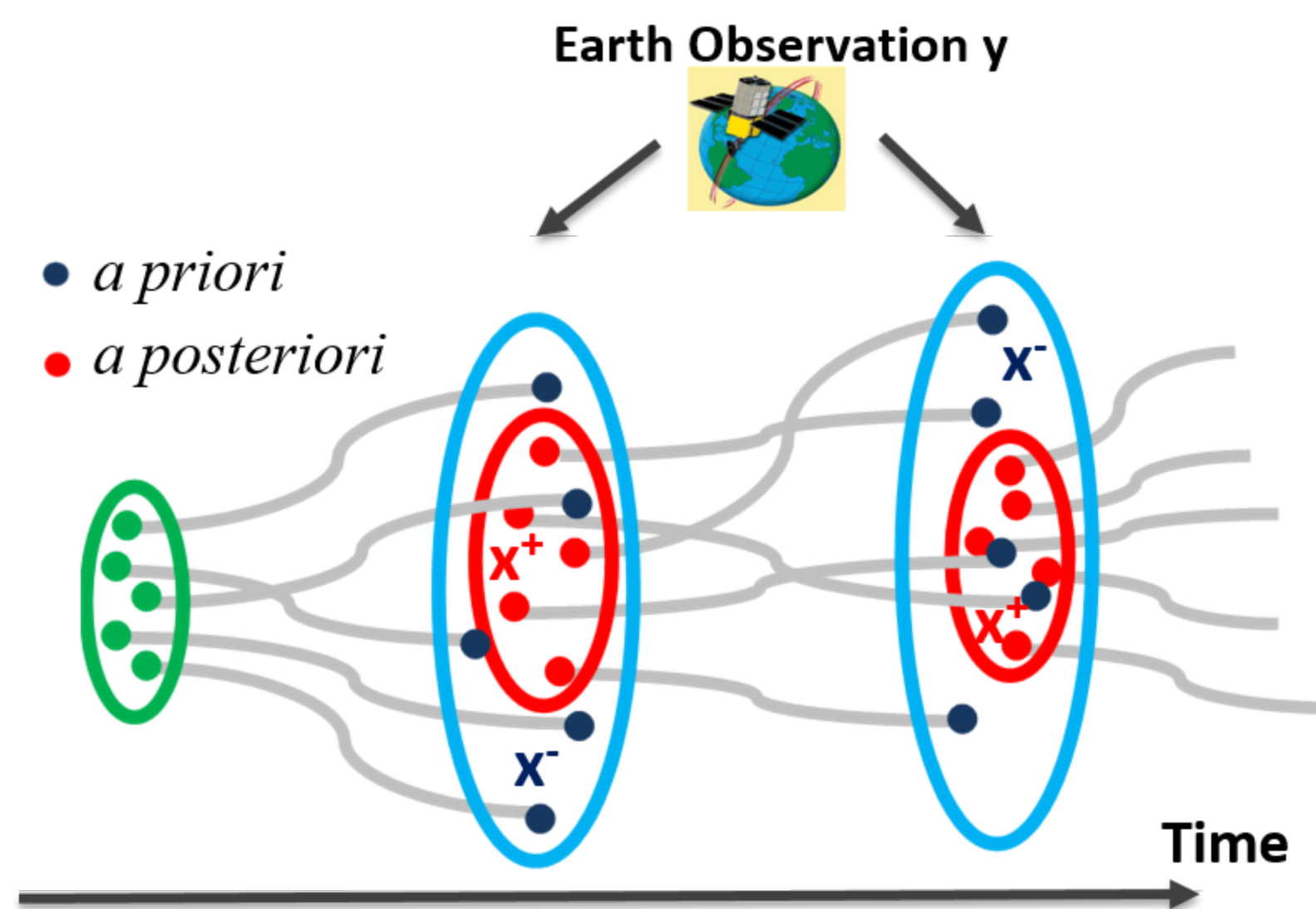Wednesday, October 30, 2019
3:00 p.m. in CC2150

Prof. Xiaoyong Xu
Department of Chemical and Physical Sciences
University of Toronto Mississauga

Towards a better understanding of water resources variability: Integration of Earth observation and hydrologic modeling

Water security and the sustainability of water resources is one of the most urgent challenges facing the world today. Recent advances in Earth observation offer the opportunities to better monitor the water cycle behavior and water resources variability. However, satellite observations, due to the limitations related to their spatiotemporal coverage and resolution, are not sufficient for many practical applications. Further, as the development of predictive tools such as physically-based hydrologic models is increasing rapidly, it is critically important to improve the skill of hydrologic modeling and prediction that typically suffer from uncertainties associated with meteorological forcing data and deficiencies in model physics. Advanced data assimilation technologies can be used to optimally integrate Earth observation and hydrologic modeling to produce spatiotemporally complete state estimation superior to either source of information alone. In this presentation, I will highlight the assimilation of satellite soil moisture observations in a hydrologic model with an Ensemble Kalman Filter, discussing the impacts of satellite soil moisture assimilation on hydrologic estimates. The assimilation of satellite terrestrial water storage data and its effects on groundwater and discharge simulations will also be discussed. This work forms a basis for a better understanding of water resources variability.