



Chemical & Physical Sciences  
**UNIVERSITY OF TORONTO**  
MISSISSAUGA

**COLLOQUIUM SEMINAR TALK**  
**WEDNESDAY, JANUARY 23, 2019**  
**3:10PM**  
**KN L1220**

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**Dr. Jane Willenbring**  
*Geosciences Research Division*  
*Scripps Institution of Oceanography*

## **Measuring the Dynamic Interaction of Landscapes and Life with Cosmogenic Nuclides and Remote Sensing Techniques**

Natural landscapes are often viewed as the scenic backdrop on which life grows; when the landscape changes, biota responds passively to this change. A new view is emerging in which landscapes represent an ever-changing canvas shaped by dynamic interactions between life and landscape, through erosion, sediment transport through rivers, and alteration of rock to produce soil. Life probably strongly influences the evolution of topography at all scales although evidence of the impact of life in mountains has been elusive. The converse is also true—landscapes affect life through bottom-up controls. Landscape connectivity and substrate composition can act as a primary control on biodiversity and flora biomass and productivity. In this talk, I will discuss our approach exploring these topics by coupling geochemical techniques, mostly involving cosmogenic nuclides, and remotely sensed data of topography and flora to show how vegetation can control topography at the scale of individual mountain stream catchments and how topography impacts life.

**Dr. Jane Willenbring** is an Associate Professor in the Geosciences Research Division at Scripps Institution of Oceanography, UC San Diego. She received her B.Sc. with honors from the North Dakota State University, a Masters degree from Boston University and her Ph.D. in Earth sciences from Dalhousie University in Halifax, Nova Scotia Canada. She was a Synthesis Postdoctoral Fellow through the National Center for Earth Surface Dynamics at the famous Saint Anthony Falls Lab at the University of Minnesota, and an Alexander von Humboldt Postdoctoral Fellow and then subsequently a Postdoctoral Researcher at the Helmholtz GFZ Potsdam, Germany.

She joined Scripps in summer of 2016, and is the Director of the Scripps Cosmogenic Isotope Laboratory (SCI-Lab). Dr. Willenbring is a geologist who solves problems related to the Earth surface. Her research is primarily done to understand the evolution of the Earth's surface – especially how landscapes are affected by tectonics, climate change, and life. She and her research group use geochemical techniques, high-resolution topographic data, field observations, and, when possible, couple these data to landscape evolution numerical models and ice sheet models. The geochemical tools she uses and develops often include cosmogenic nuclide systems, which provide powerful, novel methods to constrain rates of erosion and mineral weathering.