

# Department of Chemical Engineering Seminar Series

## 3D Hydrogel Patterning for Guided Cell Growth



### Molly Shoichet

Professor, Research Chair in Engineering  
University of Toronto

**Monday, April 13, 2015**

Lecture: 4:00-5:00 p.m.

[Physics Astronomy Building \(PAA\)](#) A118

Reception at 3:30 p.m. PAA A118

### Abstract

Many of the on-going challenges in regenerative medicine rely on understanding the cellular microenvironment sufficiently to create biomimetic structures that influence cell fate. In the central nervous system, for example, most transplanted cells die after implantation. With the aim of ultimately understanding the mechanisms that allow cell survival and controlled differentiation, we have designed a series of strategies to control cell fate using both physical and chemical properties of the scaffold. We are particularly interested in guiding cell growth and differentiation within defined three-dimensional scaffolds where the cellular microenvironment can be tuned to achieve the desired cellular response. To this end, we are examining three-dimensional chemically patterned hydrogel scaffolds for guided cell growth and differentiation using immobilized peptides and growth factors [1]. Cell-cell interactions are key to the cellular microenvironment and to better understand retinal stem cell niche, we investigated the co-culture of retinal stem cells with endothelial cells where we found a symbiotic relationship [2]. Recently, we have advanced the design of the hydrogel scaffold with control over its physical, mechanical and chemical properties [3]. The influence of these on cellular response will be described.

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### Speaker Biography

Professor Molly Shoichet holds the Tier 1 Canada Research Chair in Tissue Engineering at the University of Toronto. She has published over 480 papers, patents and abstracts and has given over 300 lectures worldwide. She currently leads a laboratory of 25 and has graduated 130 researchers. She founded two spin-off companies, is actively engaged in translational research and science outreach. Dr. Shoichet is the recipient of many prestigious distinctions and the only person to be a Fellow of Canada's 3 National Academies: Canadian Academy of Sciences of the Royal Society of Canada, Canadian Academy of Engineering, and Canadian Academy of Health Sciences. Dr. Shoichet holds the Order of Ontario, Ontario's highest honour and is a Fellow of the American Association for the Advancement of Science. Dr. Shoichet received her SB from the Massachusetts Institute of Technology (1987) and her PhD from the University of Massachusetts, Amherst in Polymer Science and Engineering (1992).