Department of Biomedical Engineering
UNIVERSITY OF WISCONSIN–MADISON

Fall 2026
Seminar Series

Myofibroblast Mechanics in Tissue Repair and Fibrosis

Boris Hinz, PhD
Laboratory of Tissue Repair and Regeneration
Keenan Research Centre for Biomedical Science at
St. Michael's Hospital
Faculty of Dentistry
University of Toronto, Ontario, Canada



Tissues lose integrity upon injury. To rapidly restore mechanical stability, various cell types are activated to become myofibroblasts. Hallmarks of the myofibroblast are secretion of extracellular matrix, development of adhesion structures with the extracellular matrix, and formation of contractile stress fibre bundles. Rapid repair comes at the cost of tissue contracture, due to the myofibroblast's inability to truly regenerate tissue. When contracture and extracellular matrix remodelling become progressive and manifest as organ fibrosis, stiff scar tissue obstructs and ultimately destroys organ function.

Pivotal for the formation and persistence of myofibroblasts are mechanical stimuli arising during tissue repair and the chronic presence of immune cells. I will provide an overview of our current projects, aiming at investigating how mechanical factors orchestrate the activation and epigenetic maintenance of myofibroblasts. I will focus on myofibroblast interactions with macrophages and the extracellular matrix in persisting wound environments, using skin and lung injury as paradigms. By understanding and manipulating myofibroblast mechanoperception and intercellular communication, we will be able to devise better therapies to reduce scarring and support normal wound healing in organ and implant fibrosis.

ABOUT the SPEAKER

Boris Hinz is the Keenan Research Chair in Fibrosis Research at St. Michael's Hospital since 2021 and a University of Toronto Distinguished Professor of Tissue Repair and Regeneration. Dr. Hinz earned his PhD from the University of Bonn, Germany, in 1998. From 1999 to 2002, he was a postdoctoral fellow with Dr. Giulio Gabbiani at the University of Geneva, Switzerland. He then led a research group at the École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, integrating cell biology, biophysics, and bioengineering. He was recruited by the University of Toronto in 2009 as a professor.

Dr. Hinz is the secretary of the Canadian Connective Tissue Society, board member of the International and Canadian Dupuytren Society, and a Fellow of the Wound Healing Society. He was president and board member of the European Tissue Repair Society. He is the Editor-in-Chief of "Wound Repair and Regeneration" and Senior Editor of the "Journal of Investigative Dermatology.

Dr. Hinz explores the role of contractile myofibroblasts in normal tissue repair and disease-related tissue fibrosis. His 171 peer-reviewed articles, 15 book chapters, and 2 edited books have accumulated over 45,577 citations and an h-index of 88 (Google Scholar). He has been invited to deliver more than 350 seminars and conference talks, and his trainees have presented over 440 abstracts at congresses. His research led to the creation of two startups, focusing on anti-fibrotic coatings for silicone implants and on "soft" cell culture devices. Dr. Hinz's research is funded by the Canadian Institutes of Health Research, the Canada Foundation for Innovation, and the Ontario Research Foundation.

Monday, November 30 at Noon
1003 Engineering Centers (Tong Auditorium)