



Università  
di Genova

DICCA DIPARTIMENTO  
DI INGEGNERIA CIVILE, CHIMICA  
E AMBIENTALE

## DICCA SEMINAR SERIES 2022

**PROFESSOR ROSS ETHIER**

Georgia Research Alliance Lawrence L. Gellerstedt,  
Jr. Eminent Scholar in Bioengineering

### **“Tissue biomechanics in myopia quantified by unconfined compression testing”**

Myopia (near-sightedness) is a common ocular condition, with over 90% of young adults suffering from this condition in some countries. Myopia is a risk factor for blinding conditions, including retinal tears/detachment, glaucoma and myopic macular degeneration. During the development of myopia, the sclera (the white part of the eye) remodels so that the eye is “too long” and images are not sharp on the retina. Here we describe a mouse model of myopia, with emphasis on measurements of scleral biomechanics using unconfined compression testing in which the sclera is treated as a bimodular biphasic material. We can reliably induce myopia in mice by using defocusing lenses, and this induction is associated with changes in scleral tensile stiffness and permeability. We also describe a novel model for induction of myopia in the mouse based on exogenous delivery of all-trans retinoic acid (atRA), and outline major challenges in mass transfer modeling of atRA within the eye.

#### **Short bio**

Professor Ethier holds the Lawrence L. Gellerstedt, Jr. Chair in Bioengineering and is a Georgia Research Alliance Eminent Scholar in the Wallace H. Coulter Department of Biomedical Engineering at Georgia Institute of Technology & Emory University School of Medicine. His research is in the biomechanics of cells and whole organs, with specific emphasis on ocular biomechanics. He works on developing treatments for glaucoma, the second most common cause of blindness, and for myopia. He has developed a new paradigm of how pressure within the eye is regulated and how the sclera plays a major and unexpected role in influencing vision loss in glaucoma. He has published approximately 220 refereed journal articles and two books, and received both Steacie and Humboldt Fellowships. His work has attracted approximately 15,000 citations and has an h-index of 73 (Google Scholar).

**01/06/2022 – 2pm (CET)**

**Villa Cambiaso - Salone Nobile, Via Montallegro 1 (GE)**

**School of Engineering, UNIGE**

**Streaming on Teams channel using this link:**

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