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Study Abroad
MS in Biomedical & Environmental Engineering

Core Faculty Profile

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Research Interests

Hydrodynamics of Glaucoma

Glaucoma results from an increase in the intraocular pressure that leads to irreversible damage to the optic nerve, and ultimate, blindness. The increased pressure results from an increased flow resistance in the aqueous outflow pathway. The goal of this research is to localize the source of this flow resistance and to characterize its nature. Our recent work has examined the mechanics of the cells of the endothelium of Schlemm's canal.

Transport across Bruch's Membrane

Age-related macular degeneration will likely be the leading cause of blindness in the developed world in the next 20 years. Our hypothesis is that this disease is caused by lipid accumulation in Bruch's membrane which is next to the retina. These studies involve use advance morphological techniques and tissue engineering techniques to evaluate this hypothesis.

Lung Surfactant Dynamics

The small airways of the lung are covered with a liquid lining that contains a unique surfactant. This surfactant is capable of reducing the surface tension of water to near zero under conditions of dynamic compression. This study involves characterization of the physiochemical properties of this unique surfactant.

Chaos and Diffusion

Chaotic systems are known to produce diffusional-like behavior in spite of the deterministic character of the governing equations. This project is involved with the use of diffusional behavior as a marker for the onset of chaos in various low dimensional systems. Using a unique method for detecting diffusional behavior, mathematical modelling will be used to determine the validity of this approach.

Selected Publications

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