Biomimetics – Understanding the nano-porous structures of diatom species for filtration
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Background
This project uses microfluidic flow visualisation methods coupled with numerical models to help understand the role of pore architecture in the filtration mechanism of diatoms (select species). The prime aim is to determine if we can be guided to an optimum membrane structure for a given separation process, by studying and understanding some of nature’s membranes.

Outcomes:

• A fundamental membrane flow visualisation technique to help characterise and understand the fundamental properties and performance membranes.
• The use of nature to gain an understanding of the properties that will allow for the most efficient separation and filtration method

Progress to date.

• Fluorescence microscopy and fluorescence correlation spectroscopy (FCS) results showing the diffusion of dye molecules through the nano-pores of the diatoms.
• The boundary conditions of the pore architecture seem to change the effective diffusion coefficient.
• Microfluidics setup with capillary fibre to study the diffusion through diatoms or any other membranes.

Cooperation is sought to

• Microfabricate a generic device that could be used for diffusion studies or particle flow visualization through diatom and/or other biological/non-biological membranes.

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