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**Living flow networks**

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Complex life larger than a humble nematode would not be possible without a circulatory system. Plants, fungi, and animals have developed vascular systems of striking complexity to solve the problem of long distance nutrient delivery, waste removal, and information exchange. These biological flow systems are frequently not static, but dynamically alter the diameters of their vessels in order to optimally achieve their intended function. The conductance of these vessels does not have to be linear, although it is frequently treated as such. Inspired by haemodynamic oscillations in the cortex, in this talk we explore how a superficially simple system of laminar flow vessels can sustain dynamic local oscillations, even in the absence of time varying boundary conditions. We will show how these non-linear conducting vessels redirect high volumes of flow to different locations of the network. We will present how the dynamics of this system is akin to an excitable system without any explicit refractory period in the vessel response. Last, we will discuss how we can harness the interplay of network topology and fluid dynamics to control flow in unexpected ways, and what this dynamic flow network behaviour can tell us about living systems.