Title: Reverse engineering neural control of behavior in Hydra

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Abstract: The freshwater cnidarian Hydra is a fascinating model organism for neuroscience. It is transparent; new genetic lines allow one to image activity in both neurons and muscle cells; it exhibits rich behavior; and it undergoes continuous regeneration. Hydra's fairly simply physical structure as a two-layered fluid-filled hydrostat and the availability of information about neural and muscle activity opens the possibility of a complete model of neural control of behavior in this small animal. We show how one can bridge neural firing to control of behavior through biophysical modelling of the muscle cell layers and a biomechanical model of the body column.

Short Biography: Adrienne Fairhall is a Professor in the Department of Physiology and Biophysics and adjunct in the Departments of Physics and Applied Mathematics at the University of Washington in Seattle. She obtained her Honors degree in theoretical physics from the Australian National University and a PhD in statistical physics from the Weizmann Institute of Science. She joined the UW faculty in 2004 and now co-directs the University of Washington's Computational Neuroscience Center and the UW Institute for Neuroengineering. She has directed the MBL course, Methods in Computational Neuroscience and co-directs the UW/Allen Workshop on the Dynamic Brain. She has held fellowships from Burroughs-Wellcome, the McKnight Foundation, the Sloan Foundation and the Allen Family Foundation. As a theorist she collaborates with experimentalists working in a wide range of systems, from hydra to primates. Her work focuses on the interplay between cellular and circuit dynamics in neural computation, with a particular interest in adaptive and state-dependent neural coding.