



PROGRESS IN NEUROSCIENCE PINS



Seminar Series of the
Brain & Mind Research Institute
Cornell Medical College (WCMC)
&

The Graduate Program in Neuroscience of
WCMC and Sloan Kettering Institute

Thursday, 1/4/18, 4 PM, coffee at 3:45 PM

Weill Auditorium

“Cortical blood flow: From vascular topology to neural control of Vasodynamics”

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Abstract



The Kleinfeld laboratory studies the angioarchitecture of the mammalian brain and the underlying flow of blood. Past studies identified the relation of vascular topology and geometry to the nature of flow. Of potential medical relevance, Kleinfeld and colleagues found that blockage of even a single penetrating vessel, *i.e.*, a vessel that shuttles blood from the surface network to the subsurface microvascular network, leads to a microstroke that appears similar to that seen in vascular dementia. Of biophysical relevance, Kleinfeld and colleagues completed the first angiome, the vectorized map of all vessels within a large region of cortex. This led to both qualitative and quantitative insight into the nature of flow patterns and the perturbation of natural patterns by activity and blockages. Most recently, Kleinfeld and colleagues had addressed the entrainment of arteriole vasomotion by ultra-slow neuronal activity as a means to understand the physiological basis for "resting state" connectivity and as a means to advance the acuity of fMRI.

Recent Relevant Publications:

1. Entrainment of arteriole vasomotor fluctuations by neural activity is a basis of blood-oxygenation-level-dependent "resting-state" connectivity. C. Mateo, P. M. Knutsen, P. S. Tsai, A. Y. Shih and D. Kleinfeld, *Neuron* (2017) 96:936–948.
2. Hierarchy of orofacial rhythms revealed through whisking and breathing. J. D. Moore*, M. Deschênes*, T. Furuta, D. Huber, M. C. Smear, M. Demers and D. Kleinfeld, *Nature* (2013) 469:53-57.
3. The smallest stroke: Occlusion of one penetrating vessel leads to infarction and a cognitive deficit. A. Y. Shih, P. Blinder, P. S. Tsai, B. Friedman, G. Stanley, P. D. Lyden and D. Kleinfeld, *Nature Neuroscience* (2013) 16:55-63.



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