



**The *BERNICE GRAFSTEIN LECTURE***  
Sponsored by the Department of Physiology &  
Biophysics of WCMC and the Graduate  
Program in Neuroscience



given as part of the  
**PROGRESS IN NEUROSCIENCE SERIES**

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

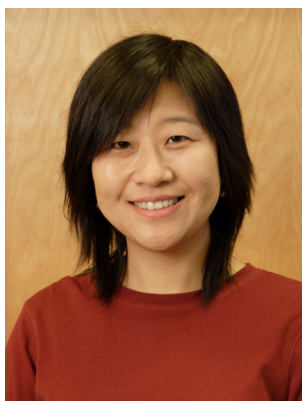
Thursday, 6/11/15, 4 PM, coffee at 3:45 PM  
A-950 AUDITORIUM

***Cocktail Reception on the Belfer Building 2<sup>nd</sup> Floor Patio to follow, 5:15 PM***

**"Interactions between nervous and vascular systems in the CNS"**

Chenghua Gu, Ph.D., Associate Professor of Neuroscience  
Harvard Medical School, Department of Neurobiology

**Abstract:**



The Gu laboratory studies the interface of two complex, structurally and functionally related systems in the brain, the nervous and vascular systems. In the past, they have demonstrated that common guidance cues and their receptors are used for wiring both the nervous and vascular systems; and revealed the basic principles governing the establishment of *neurovascular congruency*, a well-known phenomenon that blood vessels and nerves often run in parallel. More recently, they have expanded their work into two new directions that address functional aspects of neurovascular interactions. One is to understand the molecular determinants of the blood-brain barrier function and regulation, where they have made major progress in developing new technology, identifying key molecules, and discovering a new mechanism regulating blood-brain barrier function. This finding also identified new targets for transiently opening the blood-brain barrier for drug delivery and closing the BBB in treating neurological diseases. Finally, they recently discovered that neural activity influences the structural complexity of vasculature. This finding opens a new direction to understand the functional link between neurons and vascular structure, which may identify novel strategies for recovery from ischemia and stroke.

**Recent relevant publications:**

- 1) Ben-Zvi, A., Lacoste, B., Kur, E., Andreone, B.J., Mayshar, Y., Yan, H., **Gu, C.**, (2014) Mfsd2a is critical for the formation and function of the blood brain barrier. *Nature*, 509(7501):507-11. PMC in process
- 2) Lacoste, B., Comin C.H., Ben-Zvi, A., Kaeser, P.S., Xu, X., Costa, L.F., **Gu, C.**, (2014) Sensory-related neural activity regulates the structure of vascular networks in the cerebral cortex. *Neuron*, 83(5): 1117-1130. PMC in progress
- 3) Andreone, B.J., Lacoste, B., **Gu, C.**, (2015) Neuronal and vascular interactions. *Annu Rev Neurosci*. 2015 Mar 12. [Epub ahead of print]



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