

## Recommendation for Dr. Michael Sceniak

This is a letter of recommendation for Dr. Michael Sceniak for a faculty position.

Michael Sceniak was a PhD student in my laboratory at the NYU Center for Neural Science. He did research on neurophysiology of the visual cortex. He wrote an excellent PhD thesis. His thesis work resulted in three publications that had a big impact in visual neuroscience circles. His PhD thesis concerns the visual spatial summation properties of single nerve cells in the primary visual cortex (V1) of the monkey brain. His experiments, and the extensive data analysis he did, revealed that a visual cortical neuron seems to receive a compact excitatory input from a "central" region of visual space and inhibitory input from a "surround" that overlaps with and is larger than the center. Michael first studied how the center's spatial extent varies with contrast, and showed that it more than doubles in extent at low contrast. In my opinion this is a fundamental result about the function of the visual cortex. It was reported in *Nature Neuroscience* in 1999. In related work Michael studied the spatial summation properties of a large population of V1 neurons and found the prevalence of strong surround inhibition in a large fraction of V1 neurons. This work is the most comprehensive study of the spatial properties of V1 neurons so far. It was published in the *Journal of Neurophysiology* in 2001. The third paper from his PhD thesis, in *Journal of Neurophysiology* 2002, reported that the spatial frequency tuning of neurons varied with mean contrast. The tuning is narrower at low contrast for those neurons which experience expansion of width summation at low contrast. This result may seem counter-intuitive but Dr. Sceniak demonstrated that it confirms theoretical predictions of the consequences of increased spatial summation at low contrast.

After his PhD, Michael went on postdoctoral fellowships first with Dr. Edward Callaway at the Salk Institute and then with Professor Martin Usrey at the University of California, Davis. His work with Dr. Callaway included important experiments on the effect of contrast on the spatial summation of signals by LGN afferents to the primary visual cortex of macaque monkeys. They published a very interesting paper about this work last year (2006) in the *Journal of Neurophysiology*. Dr. Sceniak began his focused work on cortical biophysical mechanisms while working in Professor Usrey's laboratory. It was there that Michael began his research on whole-cell, patch-clamp recording in slices of ferret primary visual cortex. His present interests during his postdoctoral fellowship with Dr. Bruce MacIver at Stanford include the cellular physiology of cortical neurons and networks, as the basis for the functional studies he has done.

In his thesis research, Michael Sceniak became adept at single-unit recording from monkey cortex *in vivo*. From postdoctoral research and training he has learned to perform cortical afferent recording *in vivo*, and whole-cell patch-clamp recording from cortex *in vitro*. He is an expert at Matlab analysis of data, and with using computers in all aspects of

electrophysiological experiments. Michael is a quiet individual but he can express his ideas clearly and he often has deep insights into cortical function. He has broad interests in sensory function and cortical function. I recommend him strongly for a faculty position.

Sincerely,

Robert Shapley  
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