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Centre for Vision
Research

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Biocomplexity Faculty Search Committee
c/o Prof. Rob de Ruyter van Steveninck
Biocomplexity Institute, Indiana University
Swain Hall West 117
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Dear Colleagues:

It is a great pleasure to recommend **Sidney Lehky** for a faculty position in Biocomplexity at Indiana. I was Sidney's Ph. D. advisor at The University of Chicago and have followed his career closely since. Overall I would rate Sidney's work as being of exceptionally high quality in at least three areas: visual psychophysics, neural modeling, and visual physiology.

In his thesis work with me, Sidney rapidly developed expertise in both visual psychophysics and neural modeling. As a result of this he published two important studies: one using a visual masking paradigm to measure the properties of temporal frequency channels in human vision, and one modeling binocular brightness combination. These were both excellent, and Sidney's work on both topics was sufficiently independent that I encouraged him to publish both as sole author. I should also mention that both Robert Sekuler and Randolph Blake (both then at Northwestern University) were outside examiners on Sidney's Ph.D., and both commented that they had never seen such an elegantly written thesis before.

While a graduate student Sidney also became interested in the design of laboratory experiments for undergraduate students, many of them non-science majors. He was entirely responsible for designing an elegant electrophysiology experiment based on the cockroach leg. This experiment was so well designed that students virtually always obtained interesting results, and it was used for many years at The University of Chicago.

From my laboratory Sidney moved on to a postdoctoral position with Terry Sejnowski, then at Johns Hopkins. His work there resulted in several papers on both shape from shading and binocular vision. His *Nature* (1988) article describing a neural network that learned to determine curvature from shading is justifiably famous, as it demonstrated that the hidden units of the network naturally developed the properties of cortical cells to solve this task.

Sidney subsequently broadened his background to include electrophysiology by working in the laboratories of Desimone and Maunsell. One of Sidney's interests had long

been binocular rivalry, on which he had published an elegant model in 1988. His single unit work with Maunsell was designed to test aspects of this model by looking for rivalry manifested in LGN cells, presumptively as a result of cortical feedback. Failure to find this indicated clearly that rivalry had to be sought higher in the visual system. In a parallel study Sidney provided evidence that binocular rivalry is not chaotic. Thus, he has made major contributions to our understanding of binocular rivalry via psychophysics, physiology, and neural modeling.

Finally, let me mention Sidney's study of face discrimination published in the *Journal of Cognitive Neuroscience* in 2000. Sidney was able to precisely quantitate differences between faces by using combinations of "eigenfaces" with slightly different weightings of the components. By introducing noise masks after face presentations of variable duration, he showed that a task as complex as face discrimination only requires about 100 ms for its completion. This clearly places constraints on the amount of feedback that can occur between higher cortical areas (eg. TEO back to V4 or TE back to TEO) during such a discrimination task and is thus very important theoretically.

In sum, Sidney Lehky is a brilliant vision scientist with an established record of expertise in psychophysics, neural modeling, and neurophysiology, and his writing is truly lucid. I am certain that he will continue to make major scientific contributions, and I recommend him for a faculty position at Indiana enthusiastically. If I can be of any further help, please feel free to email or phone.

Sincerely,

A handwritten signature in cursive script that reads "Hugh R. Wilson". The signature is written in black ink and is positioned above the printed name.

Hugh R. Wilson

ORDCF Professor of Biological & Computational Vision