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**RE: Dr. Shinji Nishimoto**

To Whom It May Concern:

I am writing in support of the application by Dr. Shinji Nishimoto for a tenure-track position as Assistant Professor in the area of computational neuroscience at Brown University. I have known Shinji since 2000 when he joined my laboratory at Osaka University as a graduate student. He completed his doctoral program under my supervision and obtained a Ph.D. degree in March, 2005. After continuing as a postdoc for 1.5 years with me, he moved to Berkeley and joined the laboratory of Dr. Jack Gallant at the University of California, Berkeley.

He was my first student at Osaka University and has simply been my best student among all students I have had any interaction with at Osaka University and at U.C. Berkeley (where I worked with Dr. Ralph Freeman as a graduate student and later as a postdoc after obtaining my Ph.D. degree). Shinji was the person who essentially set up my laboratory at Osaka University. For most graduate students, a functioning lab is a given, but that was not the case for Shinji. I had moved from Berkeley to Osaka with just a few computers but nothing else when Shinji joined me. It was a startup from zero. During the five years, he wrote all the software needed for presenting visual stimuli, collecting the data, controlling the experiment, and analyzing the data. These are the key components for the type of experiments we do: recording from single neurons in the early visual cortex of cats. I was very much lucky that my first student ever was as capable as Shinji. In fact, without him, I might not have been able to get my lab into a functioning place for a long time.

In addition to the setup work, came up with the ideas for the work that led to his Ph.D. thesis. We conducted a lot of recordings together using the system he created. The main part of the thesis has been published as "Accuracy of subspace mapping of spatiotemporal frequency domain visual receptive fields", J. Neurophysiol. (2005).

During his short postdoc period with me at Osaka, he came up with the idea of "local spectral reverse correlation" (LSRC), which turned out to be a very powerful method in extracting great amount of data on various tuning properties of neurons from just a single experiment using dynamic random-dot stimulation. This work was published as Nishimoto, Ishida, and Ohzawa in J. Neuroscience (2006). The LSRC method is very suitable for upcoming massively-parallel simultaneous recordings from thousands of neurons, as the stimuli are not optimized for any given neuron. Therefore, the method allows us to characterize all these neurons in a short period.

During the design and execution phases of experiments, as well as during the data analysis phases, Shinji displayed at most brilliance in his intellectual as well as technical skills. I felt that his ideas were always very interesting, but the most surprising thing to me was the extreme speed with which he took his ideas and concepts to results. LSRC analysis was such an example. It was merely a matter of weeks from conception to the first of the maps that you see in the 2006 publication.

It has been about five years since he left our lab. We still use the system he developed with modifications and extensions. After moving to Gallant lab, he worked on two lines of research. I am very much pleased to see many papers coming out with Shinji as the first author, because I know how hard it is to bring work involving primate electrophysiology to a published form.

One line of research is an attempt at reconstructing the visual experience of human subjects watching YouTube movies based purely on the fMRI recording from these subjects. The approach he took in this project is based on building-in a very detailed model of V1 neurons in both space and time domains. In this sense, this is a kind of study only he could have done with such speed. He had three ingredients needed for this work: (1) fMRI skills, (2) intimate knowledge of single cell electrophysiology, (3) computational modeling. I believe that it is rare to see all these skills combined in one person. He is certainly one of the very rare examples. Although the position description specifies computational neuroscience as the target area, his qualifications go well beyond just that area. However, I am convinced that, to be a truly effective computational neuroscience expert, these combinations of skills will be essential in the future, if not so already.

The other line of research is on how MT neurons get their motion-sensitive properties. This has also been published recently as "A three-dimensional spatiotemporal receptive field model explains responses of area MT neurons to naturalistic movies" J. Neuroscience (2011). The study essentially identifies experimentally a set of V1 neurons that make up the tuning properties of an MT neuron. His experimental work demonstrates clearly the type of organization that Simoncelli and Heeger (1998) proposed in their modeling study.

I believe that all of these skills and published work demonstrate how good he really is. I was sorry to see Shinji leave my lab, because he is so capable. He was also very much a pleasure to work with. I am sure that Dr. Gallant feels the same way. However, that is all to his and your institution's benefit. I have no question that he will flourish with respect to his research, and will also contribute greatly for students and colleagues at your institution.

Sincerely Yours,

A handwritten signature in black ink, reading "Izumi Ohzawa". The signature is fluid and cursive, with the first name "Izumi" and last name "Ohzawa" clearly distinguishable.

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