



DEPARTMENT OF STATISTICS

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To Whom It May Concern:

I am writing to strongly support **Dr. Shinji Nishimoto's** application for a faculty position in your department.

I am a statistician (both applied and theoretical) and my recent research focuses on statistical machine learning theory/methods/algorithms and solving data problems from a wide range of domain science areas including neuroscience and remote sensing. I have known Dr. Nishimoto since 2006 when I spent a year in the Gallant Lab to get into neuroscience. Shinji was beginning his postdoc in the lab. He struck me as a bright and thoughtful person who spoke when he knew what he was talking about – a very positive trait getting rare in young researchers.

Over the last 5 years, my group has developed a long-term collaborative relationship with the Gallant Lab and we work on teams to tackle computational vision science problems by analyzing the excellent data (both physiological and technological (e.g., fMRI)) collected in the Gallant Lab. In particular, we developed a direct collaborative relationship with Shinji in the movie reconstruction project based on fMRI signals, which was led by Shinji. The results have just been published in a recent Current Biology article, which has received an extensive media coverage.

Our work with Shinji focused on the prediction of fMRI activity evoked by natural image and natural movie stimuli, and refining the methodology for identification and reconstruction of natural stimuli based on prediction models. Shinji was the main engine behind the full analysis pipeline; he was also the gate-keeper. Previous work by the lab focused on discrete images and discretized responses; He devised, optimized, and implemented many ideas required for this to work on videos. Arguably the most important of these was his idea for a feature space that successfully relates videos to neural activity; but I would prefer highlight other aspects of his work that we found admirable.

In the process of working together, Shinji showed an integration of deep statistical and engineering understanding, combined with a strong emphasis on evidence based decision-making. He carefully analyzed the statistical aspects of problems but did not shy away from alternative solutions when those prove themselves to work best. An example: initial versions of the Bayesian video decoder did not produce satisfying results. Shinji identified problems with the estimated posterior distribution due to the correlation between samples that is inherent in both video and fMRI. However, implementations to improve the posterior gave unsatisfying results, so Shinji devised a simpler heuristic that greatly improved the quality of the decoder. In other words, he is greatly knowledgeable in statistical engineering, but is not afraid to deviate from theory when practice shows differently. In my view, he possesses the qualities of a top applied statistician with a healthy can-do attitude of a top engineer. Needless to say, he is also an excellent neuroscientist. Shinji's publication list might not be as long as some of the other young researchers, but the quality of his publications speaks for itself as that of the breakthrough *Current Biology* paper.

In summary, it has been our great pleasure to work with Shinji as collaborators. He is an incredibly talented and creative researcher with an engineering background, a biology PhD, and an excellent data or common sense as a statistician. With the availability of massive amounts of data in neuroscience, researchers such as Shinji with superb quantitative modeling skills have a great advantage when tackling big challenges in neuroscience. I give him my very high recommendation for your position.

Thank you very much for your consideration.

Sincerely yours,

Bin Yu

A handwritten signature in black ink, consisting of a stylized 'B' followed by a series of loops and a long horizontal stroke.

Chair

Department of Statistics

Professor

Departments of Statistics, and of Electrical Engineering & Computer Science