STANFORD UNIVERSITY SCHOOL OF MEDICINE
DEPARTMENT OF NEUROBIOLOGY

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HOWARD HUGHES MEDICAL INSTITUTE

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To the search committee,

I am pleased to write a strong recommendation on behalf of Dr. Alireza Soltani who is applying for a faculty position Brown. I have known Alireza now for about 2 years, beginning about 1½ years before he joined my laboratory at Stanford. I first met Alireza when he was a postdoctoral fellow in Christof Koch's lab where he worked on a spiking network model of bottom-up salience modulation within visual cortex (areas V1, V2 and V4) and the influence of top-down attention on that modulation. The model was based on the experimental observations both in my lab and others demonstrating that physically salient visual stimuli elicit enhanced visual responses within visual cortex during passive fixation. We had recently shown that the salience-driven enhancement, despite being present in the absence of top-down attention, was nonetheless dependent on top-down resources[1]. This result ran counter to many previous assumptions about the independence of bottom-up and top-down attention mechanisms, including the assumptions of computational models. To address this shortcoming, Alireza constructed a biologically plausible, spiking model of the salience computation that included a top-down dependent component in which bottom-up salience could be both enhanced or disrupted by feedback projections from presumed top-down attention structures such as the lateral intraparietal area (LIP) or the frontal eye field (FEF). This is an important study that was published in the *Journal of Neuroscience* in 2010[2].

Subsequent to the salience modeling, Alireza began another collaboration with my laboratory while doing a postdoc with Reed Montague at Baylor. In this collaboration, Alireza teamed up with a former graduate student of mine, Bob Schafer, to attempt to dissociate the influence of reward on attention and choice behavior. This rather exciting project took advantage of 1) Alireza's deep expertise in computational modeling of reward and 2) a pre-existing dataset in which choice behavior and attentional deployment were measured independently in monkeys both during control trials and during electrical microstimulation of the FEF[3]. Alireza had realized, from reading the first published account, that the dataset offered a unique opportunity to dissociate what many investigators have found it difficult to impossible to dissociate, namely the effects of reward history on choice and attention. Within a short time Alireza had revealed that within the data these two influences were indeed separable, and that even when attentional deployment is not required to receive a reward, it is nonetheless governed by reward history. This finding marks an important and timely discovery and we recently submitted a paper to *Nature Neuroscience*, where it is currently under review[4]. Naturally, I was pleased to recruit Alireza to my laboratory this year and it was clearly an appropriate move as he had already been collaborating with my group for years.

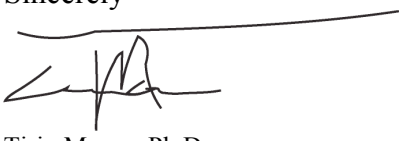
While completing his work on the reward effects on behavioral choice and attention, Alireza made another rather important observation about some effects we had observed within another study. In the study, we had found that local manipulations of either dopamine D1 or D2-mediated FEF activity could increase the probability that monkeys would target visual stimuli with saccadic eye movements in the corresponding part of visual space[5]. The effects of both manipulations on saccadic target selection were identical, and thus we had assumed that their effects on oculomotor control were identical. However, Alireza quickly noticed that the changes in the sensitivity of monkeys to rewards

associated with targeting saccades were qualitatively different following the two dopaminergic manipulations. This is an exciting observation that has not only produced another important paper we now get to write[6], but has also prompted an entirely new set of neuropharmacological and neurophysiological studies in which we plan to tease apart the relative roles of D1 and D2-mediated prefrontal cortical activity in target selection and attention, an important step in understanding the neural mechanisms of reward-driven attentional deployment. Thus, within 6 months of having joined my lab, Alireza has already opened a whole new avenue of high impact research. Needless to say, I am quite pleased.

As is clear from the above, Alireza is a highly intelligent, ingenious, creative and ambitious scientist. Perhaps most importantly for him as a computational neuroscientist, he has demonstrated several times over that he is an insightful and prodigious collaborator with experimentalists, something that is crucial for anyone doing primarily computational modeling and theoretical work. Perhaps because of Alireza's unique acumen for the analysis of experimental data, none of the computational neuroscientists that I've worked with to date have been able to prompt as many first-order, fundamental experimental questions as he has. He has a keen and astute sense of the subtleties of both neurophysiological and behavioral data and it a real pleasure to work with him in that capacity. Alireza's work places great importance on experimental findings from the cellular to behavioral level and he has good intuition about how such observations can be incorporated into computational models to investigate key question at hand. In addition, he is highly motivated and creative in going beyond modeling the existing data to make non-trivial predictions and to set about designing and performing new experiments to test these predictions. During the short time he has spent in my lab, he has designed a few important experiments to test specific predictions that emerged from his modeling work. One of these experiments is currently under way. As an experimentalist, I have therefore found him to be an extremely valuable collaborator. Lastly, Alireza is also a very warm, generous and convivial individual who is usually eager to help graduate students and/or younger postdocs. I therefore have no doubt that he will be an asset to any department lucky enough to recruit him.

Please let me know if you have any further questions.

Sincerely



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