



Professor David Sheinberg
Department of Neuroscience
Brown University
Providence, RI
May 1, 2012

Dear David,

I am writing this letter to strongly support the application of Dr. Tony Vladusich for a tenure track assistant professorship in computational neuroscience in your department. I have known Dr. Vladusich for more than a decade. He first came to my notice when, as a student studying towards his undergraduate degree in neuroscience at The University of Queensland in Australia, we funded his travel to the 1997 annual International Conference on Cognitive and Neural Systems (ICCNS) at Boston University, of which I am the general chairman. At ICCNS, Tony presented neural modeling work, with Professor Jack Broerse, that was eventually published in the journal *Neural Networks*. This work explored a novel and sophisticated computational approach to analyzing color constancy and the famous McCollough color aftereffect, wherein there is a long-lasting color after-effect that is contingent on the orientation of the inducing stimuli. Tony developed this model based on his readings of my FACADE theory of 3D vision and figure-ground separation. I was very impressed by the fact that an undergraduate student managed, on his own through self-directed study, to master perhaps the most advanced computational theory of how the brain sees the world in depth, and to build on it in an intelligent way. His ability to think independently and creatively about the most difficult issues was already evident at this time. His enthusiasm and motivation, and his ability to provide a clear exposition of difficult research material, were also exceptional. These qualities have persisted to the present time.

Tony conducted his PhD research at The Australian National University (2000-2003), under the supervision of Prof. Mandyam Srinivasan and Dr Jochen Zeil, on the topic of how honeybees integrate visual and odor cues during navigation tasks, resulting in two publications in *Journal of Experimental Biology*.

After that, Tony did postdoctoral work with Dr Frans Cornelissen and Dr Marcel Lucassen in The Netherlands (2003-2007). He hereby established his scholarly reputation as a productive experimentalist and modeler in the study of brightness perception and surface filling-in. Together with his colleagues, Tony has published high-quality papers in *PloS Computational Biology*, *Journal of Neuroscience*, *Journal of Neurophysiology*, and *Journal of Vision*. These projects included both psychophysical and fMRI techniques. Alex Wade and Brian Wandell were also collaborators on the fMRI study.

Tony also had an emerging interest in how normal behavioral processes may get altered during various mental disorders. Thus, in the period 2007-2008, I finally had a chance to work with him directly in a team that I put together to do a project that would study autism both experimentally and through neural modeling. The project grew out of a 2006 *Psychological Review* article in which Dr. Donald Seidman, an autism clinician, and I described a neural model of key brain mechanisms that may underlie autism. Tony hereby came to Boston University to work as an NIH-NSF postdoctoral fellow with Professors Helen Tager-Flusberg, Dae-Shik Kim, and myself. Professor Tager-Flusberg is a leading autism experimentalist, and Professor Dae-Shik Kim was then Director of the Imaging Center at the Boston University School of Medicine. This project involved (a) testing through psychophysical experiments a modeling prediction about how category learning and attention may be altered in various autistic individuals, and (b) developing a theoretical framework for understanding some of the key mechanisms of social cognition, notably how infants may learn to follow gaze, share attention, imitate their teachers and use tools during social interactions., and how these competences may be altered in autism. Tony's highly developed skills in working at the interface between theoretical and experimental approaches in neuroscience—a task rendered considerably more difficult in patient populations—ensured the success of these projects, whose results were published in the journals *Autism Research* and *Neural Networks*, the latter in a special issue on Social Cognition which includes contributions about both normal and autistic social cognitive skills and mechanisms.

I should also note that Tony has a clear, elegant, and efficient writing style that has made the task of collaboratively writing articles an enjoyable experience.

Tony's more recent research activities (2009-present), with Dr. Don Katz and Dr. Paul Miller at Brandeis University, involve the application of hidden Markov models to the problem of neural taste coding in rats. This research continues Tony's thematic interest in the question of how sensory information is integrated in the brain to generate globally sensitive representations of behaviorally relevant objects.

It is my understanding that Tony desires to establish his own research laboratory to further investigate the neural mechanisms of visual perception, notably of brightness and contour integration, in humans using a combination of psychophysical, brain-imaging, and computational techniques. He is currently developing a computational theory of achromatic color perception, building on his previous work modeling achromatic colors in a two-dimensional brightness-and-darkness space. The theory seeks to further clarify phenomena in brightness, lightness and transparency perception.

I have no doubt that Tony's high intelligence, motivation, and wide range of interdisciplinary research knowledge, technical skills, and research experience, together with his excellent scientific communication abilities, will culminate in a sustained period of success. Tony should be a very effective teacher, and has all the intellectual and social skills needed to carry out challenging research independently and collaboratively on a wide range of topics in cognitive science and neuroscience.

Best wishes,

Steve

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