



SALK INSTITUTE
FOR BIOLOGICAL STUDIES

December 10, 2003

Biocomplexity Faculty Search Committee
c/o Prof. Rob de Ruyter van Steveninck
Biocomplexity Institute
Indiana University
Swain Hall West 117
Bloomington IN, 47405-7105

Dear Dr. de Ruyter van Steveninck

I am writing on behalf of Dr. Peter J. Thomas, who has applied for a faculty position. Peter is currently a postdoctoral fellow in my laboratory and is also working closely with other faculty at the University of California, San Diego on stochastic modeling of cellular signaling systems. He has a strong background in mathematics and is at the forefront of computational biology, a growing discipline that has greatly benefited from an avalanche of genetic and cellular data and on the continually increasing computational power of digital computers.

Peter is working on a Monte Carlo model of a cell signaling at glutamate synapses in the central nervous system. In particular, he has focused on the activation of calcium-calmodulin kinase II in the postsynaptic density, which is an important regulatory enzyme that affects the strength of the synapse. He has also helped out with other biophysical problems that arise during the binding of glutamate to receptors in the synaptic cleft.

The second major project that Peter is working on is the orienting response of Dictyostelium with Drs. Herbert Levine in the Department of Physics and Bill Loomis at the University of California, San Diego studying signal transduction in both prestalk and prespore cells. The question is how Dictyostelium senses cAMP gradients. He has been involved in interpreting experimental data and suggesting new experiments. Peter also interacts with Dr. Sydney Brenner, who has started a new experimental program at The Salk Institute on signaling systems and macromolecular complexes.

Although these might seem entirely different problems, they all involve chemical reaction networks that are spatially heterogeneous with low concentrations of molecules, giving rise to highly stochastic behavior. Peter is developing new analytical and computational approaches to these problems that should have widespread applications to many biological systems.

Biocomplexity Faculty Search Committee
Indiana University
December 10, 2003
Page two

In addition to his research on modeling at the cellular level, Peter also has made major contributions to systems-level problems. In my laboratory he has studied the accuracy of spike timing in the responses to regular and noisy inputs, and found conditions where the same input can give rise to more than one repeatable pattern, depending on the history of the neuron and the intrinsic noise. Recently, we have confirmed these results by analyzing *in vivo* recordings from cats and monkeys.

Peter is attacking difficult problems in areas of computational biology where there are great opportunities. There are few mathematicians of his caliber with as strong a biological direction in their career trajectory. In addition to his skills as a researcher, he is gregarious and has helped many others in the laboratory with mathematical problems. He is an ideal colleague to have nearby. I enthusiastically recommend Peter Thomas for a faculty position.

Sincerely,

A handwritten signature in cursive script that reads "Terrence Sejnowski".

Terrence J. Sejnowski

Professor, Salk Institute
Investigator, Howard Hughes Medical Institute

Professor of Biology and Neurosciences,
University of California, San Diego