



Center for Theoretical Biological Physics

Encompassing a broad spectrum of research and training activities
at the forefront of the biology-physics interface.

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December 9, 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 Search Committee,

I am writing on behalf of Peter Thomas, a postdoc at the Salk Institute computational neurobiology lab, who I believe is applying for a position at your institution.

I have known Peter for several years, ever since he realized that information processing issues which are common in neuroscience could in fact be studied as well in cell biology. He independently came across the chemotaxis decision-making process in *Dictyostelium* as an excellent model system and was directed by Terry Sejnowski to us, as we have been studying aspects of *Dictyostelium* dynamics for the past decade or so. We combined forces, leading to a paper in the *Biophysical Journal* on temporal sensing mechanisms for this decision, a paper which I am happy to say is sufficiently controversial that several experimental groups set out to test its ideas. While the jury is still out on whether our model will truly prove prescient, I view this project and Peter's role in making it happen as a great success story. Since then, we've kept in touch as Peter has tried to apply some novel ideas from communications theory to quantify signal processing in cellular systems. I think that this is a promising direction and we have tentatively decided to try to apply his results to calcium signaling, in particular to frequency-coding effects seen in gene expression patterns elicited by hormonally-induced rises in Ca^{++} concentrations.

I am not sufficiently familiar with the neural part of his research record, so I will leave that to others to comment on. As far as general capabilities, Peter's strongest points are his intense curiosity about biological systems, his willingness to pay attention to the biological details, and his creativity. His analytical and computational abilities are adequate, although I think that he would be best served by teaming up with others who focus on the technical details of computational implementation while he focuses on deriving useful models and making sense of results as far as their biological implications. He is quite articulate and should have no difficulties either in teaching (at any required level) or in proposal writing.

<http://ctbn.ucsd.edu>

In short, Peter can play an incredibly important role of interfacing biologists to the possibilities engendered by modern computational science and modern non-equilibrium physics. Placed in the proper environment, he will help make exciting things happen.

Sincerely,

A handwritten signature in black ink that reads "Herbert Levine". The signature is written in a cursive style with a large, sweeping initial 'H' and a long, horizontal tail on the 'e'.

Herbert Levine, Professor of Physics and Co-Director,
Center for Theoretical Biological Physics