November 2, 2004

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

Dear Dr. Steveninck,

It is a pleasure to recommend Stephen Proulx for a position in Biocomplexity at Indiana University. I worked with Stephen as chair of his Thesis Advisory Committee in the Department of Biology at the University of Utah, and have followed his work during his subsequent post-docs at the University of Toronto and the University of Oregon. Building on his extraordinary natural intelligence and enthusiasm, Stephen has become a fine researcher, scientist, and colleague.

Students in my lab receive little guidance regarding specific topics for research. Quite early in his career, Stephen came up with the original idea that has formed the basis of his thesis, and which has motivated his ever-broadening interest in the genetics of subdivided populations. Stephen's thesis develops mathematical models that verify his intuition that sexual selection can promote the evolution of niche breadth in spatially subdivided populations. The second part of his thesis turns the question around, showing that environmental heterogeneity is sufficient to maintain potentially costly female choice. It is typical of Stephen's work that he comfortably unites thinking about ecology, evolution, and behavior.

Stephen worked on one other major problem during his graduate career: the "cost of variance". Based on an idea of Eric Charnov's, he has shown that a plant will be favored to invest less energy in the gametes with more variable success (generally males or pollen). To solve this problem, he learned methods from stochastic processes, and used them to correct a long-standing error in the literature. Unlike many theorists, Stephen always seeks to understand how mechanisms will operate in the real world. In this case, he has identified the population structure necessary for this mechanism to be effective in realistically large populations.

Stephen has continued to extend both of these ideas in quite unexpected and creative ways. His work on sexual selection led him into the challenging area of signaling theory, where he has addressed several ways in which context affects both signal senders and receivers.

In particular, he has addressed, in some work picked up by the popular press, how age should affect signaling by males. In a more fundamental paper, Stephen addressed the common assumption that the quality which males signal is equal to their genetic utility to females.

Similarly, his work on stochastic selection and adaptive dynamics has improved our basic understanding of natural selection in finite populations, with particular attention to the classic problems of sex allocation.
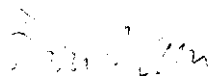
Finally, and for me most impressively, Stephen has begun important research on genetic networks. In our recent conversations, I have been continually enlightened by his thoughts on this complex area, where his combination of mathematical expertise, ecological insight, and understanding of evolutionary biology will bring some order to an area that is some-times seems dominated by wishful thinking.

Stephen is one of those genuine researchers for whom "it's all biology", whether it be the details of genetic recombination or the range expansion of a butterfly. He has the combination of intellectual fearlessness to try new things, along with the honesty to know when they aren't working out. He has the knack of distinguishing wheat from chaff in papers and talks about throughout the whole range of biology.

Personally, Stephen is completely open to others and is the kind of person who brings people together both socially and intellectually. Students feel comfortable with his relaxed manner, and he is a fine and patient one-on-one teacher.

Stephen is developing into a truly integrative modern biologist, uniting empirical, theo-retical and computational aspects of genetics, population dynamics, and behavior. With his work on genetic networks, Stephen is truly capitalizing on his tremendous range of talents. He is among the best young theoretical evolutionary biologists in the country, and I give him my highest recommendation for this position.

Sincerely,

Frederick R. Adler
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    and Mathematics
University of Utah
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