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Dear Search Committee,

Please accept my strong recommendation for Steven Andrews for the position of assistant professor in your department. I have known Steve personally since he joined my lab in 2003 to work on understanding the physical chemical behaviors and constraints of cellular network regulatory motifs and their evolution. I knew Steven from his very nice work on spatial modeling and spatial regulation with Dennis Bray and even from his very excellent work with Steven Boxer on Stark Effect in proteins. His work with Bray has recently been published in two very nice articles on a new efficient method for efficient stochastic particular simulation (which has formed the basis for a number of new publications in the Bray lab) and a very clever paper on the effect of receptor rebinding of ligand specificity. He is a very talented physical thinker and is not afraid to quest after deep and difficult questions in biophysical descriptions of cellular phenomenon. On joining my group as an NSF fellow he chose to work on a few highly challenging and risky projects. He wished to follow up a line of thinking that had been developing the lab that by combining comparative genomics, physical modeling of networks and evolutionary game theory there might be a way to understand how different environments and physical constraints on the cell (such as its size, etc) might lead to different regulatory network designs. This is a deep and difficult issue and so he has first set about thinking about the problem abstractly using simplified mathematical models of environments and bacterial dynamics and evolution. His initial studies explored how different network structures and environments could lead to niche partitioning by the bacterial quasi-species. It was a very simple conference paper but it was an interesting foray into the area and others in the field of epidemiology and population evolution have encouraged him to publish in an archival journal. He is pursuing that now. He is now working on detailed modeling of a spatially-regulated system that we believe is strongly selected and physically constrained and which also has a long evolutionary history: The minCDE system. With a graduate student who rotated in my lab he has used his SMOLDYN software and other approaches to try and better model this system as a first step to a broader analysis. In doing so he has ferreted out a number of deficiencies in the current models and a number of problems in the physical modeling of these networks (how to deal with filamenting systems on membranes coupled to bulk chemistry, for example) for which he has been developing a number of more or less rigorous approaches. In fact, he has developed a fairly general theoretical framework for studying the thermodynamic, kinetic and mechanical control of assembly of bacterial filaments

such as minD, mreB, and ftsZ inside bacterial cells of different geometry. It is fascinating work with a very interesting theoretical framework surrounding it. He is writing up this work now. I think that in this system he has found a rich area in which to use his considerable physical science skills, his programming expertise and his good sense for experimental design. He is also pursuing highly innovative experiments with Jay Grove in Chemistry on filament protein/membrane interactions to prove some of his theories of the filament/membrane mechanical interaction. I believe he will push the field forward.

Steven is a thoughtful and careful fellow and I think I would not be out of line saying that he therefore seems to be a slower starter. Also—frankly, my lab tends to draw out publications for as long as possible. It's my fault not his. I have full faith that he will accomplish what he sets out to do. He is creative in his approaches and excellent in the execution of his ideas. He is a good communicator, though he speaks even faster than I do, and I can immodestly say that I am legendary for speaking too quickly. He is a good mentor—he has brought out wonderful things in the students he has mentored in my lab (one graduate student and one undergraduate). I think he will be a good teacher and mentor as a professor.

I have a hard time placing him against other my students, because he is a very different sort of scientist from them, who have recently moved on such as Christopher Rao (now at UIUC), Christopher Voigt (now at UCSF) and Eric Alm (who recently got an offer from M.I.T.). While he has not been as overtly productive as these three, I think he is in the same class overall. The papers he is writing now are certain to be of very high interest to people in the field and perhaps beyond. He is certainly a unique blend of skills and interest and I believe he would be an asset to any department.

If I can be of further assistance don't hesitate to contact me.

Best,



Adam Arkin