

December 1, 2004

Dear Members of the Faculty Search Committee,

I am pleased to be able to write a letter in support of **Daniel B. Forger, Ph.D.**, in his application for a faculty position at your institution.

I have known Danny Forger for several years. We collaborated for over three years on a project supported by DARPA. The PI of this project was originally Dr. Megan Jewett, but I succeeded her as PI half-way through, and I was also the Experimental Team leader. In this project, we have been working to develop molecular-based mathematical models of the mammalian circadian clock, through combining experimental and modeling approaches in a complementary manner. I have thus had extensive interactions with Danny and I am in an excellent position to comment on his qualifications, from a biologist's perspective.

As an undergraduate, Danny was involved in developing models of the human circadian system and its response to light. These computational models did not have a molecular basis; rather, they treated the circadian oscillator as a mathematical black box.

During his graduate career, Danny made major contributions by developing mathematical models of the mammalian circadian clock based on actual biological mechanisms. This work took advantage of the flurry of discoveries regarding the molecular basis of circadian rhythmicity that began in 1997. Danny and his doctoral mentor, Charlie Peskin, developed and publishing a new mathematical model based exclusively on experimental data, much of it from our group. They also developed a stochastic version of the model. Both papers have been published in PNAS. It is important to point out the effort that this took. Danny needed to understand the interactions of the molecules he was modeling, and so he avidly attacked the task of learning the ins and outs of molecular biology. To extend his knowledge, he has more recently worked as a postdoc in the lab of Justin Blau, studying the molecular basis of circadian rhythms in the fruit fly. His work there has led him to develop mathematical models and to conduct complementary experimental work to test hypotheses regarding the molecular mechanisms by which the circadian clock maintains its near-24 hour cycle length over a broad range of temperatures ("temperature compensation"). He has also worked with one of my UMass colleagues, Dr. David Paydarfar, on issues of oscillatory behavior in non-circadian systems.


I have not even had college level calculus, so it should be obvious (as it is to me) that our ability to communicate is based entirely on Danny's ability to speak my language, rather than the other way around. His ability to translate the mathematical models into terms I can understand and to propose experiments that will test predictions of the mathematical models has regularly impressed me. Danny has learned enough molecular and cellular biology, on his own, to more than hold up his end of every conversation about molecular mechanisms of rhythmicity that we have had. From my

perspective as an experimentalist, he is a fantastic colleague, able to integrate biological data with computational models, and he brings a level of enthusiasm to our discussions that energizes the entire group.

Even while still a graduate student with Professor Peskin, Danny played a leading role in our DARPA-funded project. Danny was the Team member with whom I interacted the most, by far, and we continue to have regular conversations even though the project support period has ended. The role that Danny played in the project extended remarkably far beyond what one would expect of a graduate student, or even a postdoc. On one occasion, he gave the presentation for our entire DARPA Team at one of the PI meetings (equivalent to a national meeting). At other meetings and site visits, he was a reliable participant with whom I often made joint presentations. He has made extensive contacts in the modeling field and in the rhythms field, he networks well, and he is always prepared to contribute. I interact with him as I would another established investigator, and I expect we will continue to collaborate. He is performing at a level of independence, responsibility and scientific contribution that is above that of all post-docs I have known. It is my opinion that Danny is already equivalent to a junior faculty member, lacking just the position and title. He is clearly among the best and most well-respected in his area of expertise.

Danny's future research plans reflect a desire to continue both the experimental work and modeling in a complementary manner. He will be an excellent addition to either a biology department or to a math department, but I expect he will truly thrive in a setting that fosters the interdisciplinary approach that he embodies, drawing on both areas. I expect he will continue to be productive and successful. Danny is simply an outstanding faculty candidate.

Please feel free to contact me if I can provide any further information.



David R. Weaver, Ph.D.

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and
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