

MICHIGAN STATE UNIVERSITY

15 January 2012

Dear Colleagues:

I am writing in support of the application of **Dr. Jeff Clune** for a faculty position in your department. I know Jeff very well. He was a student in a graduate-level course that I taught; I served on his dissertation advisory committee; I co-authored a paper with him; and I have followed his work closely since then. In short, Jeff is an exceptionally creative, intelligent, and interesting scholar with unusually broad training and interests in computer science, biology and philosophy. His research is outstanding in its rigor, breadth, and creativity, and he has addressed many fascinating issues at the interface of computer science, biology and engineering including applications of genetic algorithms, direct vs. indirect encoding of complex phenotypes, kin selection, phenotypic plasticity, and evolution of mutation rates.

Jeff has already published 18 papers in scientific journals and conference proceedings, including 13 for which he is the first author. One of his papers was chosen as the most outstanding paper in the *Proceedings of the Genetic and Evolutionary Computation Conference* in 2009. I collaborated with Jeff on another paper that appeared in 2008 in *PLoS Computational Biology*. In that study, we tested whether “digital organisms” – programs that replicate, mutate, and evolve – would, if given genetic control over their own mutation rate, evolve to the rate that would be optimal for sustaining their long-term improvement. The rather surprising answer was that they did not, in general, achieve the long-term optimal rate. Instead, selection to minimize deleterious mutations typically led them to evolve much lower mutation rates, especially in environments with multiple fitness peaks separated by deep valleys of maladapted intermediate states. Jeff led this research project in all respects, and I was very impressed by his work in formulating the questions, designing experiments, analyzing data, devising new experiments, and explaining the results in writing and in oral presentations.

Based on his superb accomplishments as a graduate student, Jeff received a highly competitive and prestigious NSF postdoctoral fellowship, and he is now working with Prof. Hod Lipson at Cornell. Jeff recently returned to MSU and gave an outstanding talk on his latest research on modularity. The talk was outstanding, and I understand



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that Jeff and his collaborators have submitted a paper to *Science* on this fascinating and important work. Jeff will be a tremendous asset to whatever institution hires him.

In summary, I'm extremely impressed by Jeff's abilities, his rigorous thinking, his deep curiosity, his impressive communication skills, and his exceptional creativity. He is well on his way to becoming a world-class researcher at the interface of computer science and biology. Therefore, I recommend him to you most highly.

Sincerely,



Richard E. Lenski
Hannah Distinguished Professor
and
Member, National Academy of Sciences