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February 13, 2007

Student: Christina Hayes
Mentor: Dr. Tomas Gedeon

To whom it my concern.

this is a letter of recommendation for Christina Hayes, who is applying for US-Africa Advanced Studies Institute on Mathematical Modelling of Infectious Diseases in Africa.

I am Christina's graduate thesis advisor and her mentor. I have known Christina for over three years. I will address in this letter both Christina's research.

Christina's thesis work is in the area of genetic and evolutionary algorithms. Christina took a computer science class three years ago in the Computer Science department at MSU and became very interested in this subject. Most of the people in this area work in computer science and engineering. They tend to place the emphasis on performance of the algorithms for their particular application. Therefore there is a lot of ad-hoc variability on the top of the basic genetic algorithm theme, that is highly dependent on the particular application. Christina got interested in a so called "infinite population approximation" model for the algorithm, where iterations of the algorithm are represented by iterations of a certain map on a population simplex. Studying this problem gives an insight into the performance of all variations of the genetic algorithm. She asked me to be her advisor, because my expertise is in the areas of dynamical systems and applied mathematics. Since the infinite population model is a dynamical system, I consented to be her advisor, even though my expertise at the time in the area of genetic algorithms was limited. The closest person working professionally in this area is Professor Alden Wright at Department of Computer Science at University of Montana. Christina visited him and he suggested some of the problems she has been working on in the last two years. I have included these details about how she ended up with her project and the advisor shows her dogged determination and the ability to find the right people and get things done, once she decides on the course of action.

In the Fall 2005 I have taught a special topics course in Mathematical Epidemiology

from a book that emphasised modelling process and used stochastic as well as differential equations models. Christina was very excited about the topic and we have talked about possible projects in this area. In the spring of 2006 she graduated and spent the Fall of 2006 finishing up her thesis work. Now she is ready to explore further epidemiological models. Based on the experience I had with her determination with evolutionary algorithms, I know she is serious and she will do well.

I would also point out that she is in an excellent undergraduate institution and her plans since she took the epidemiology class always featured the desire to engage undergraduate students in mathematical epidemiology research. I think this is a unique opportunity to have a large impact on undergraduate research.

Christina has a solid background in both dynamical systems and statistic so she is well prepared for modelling problems in epidemiology.

If you have any further questions, please do not hesitate to contact me.

Thank you,

Tomáš Gedeon