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Systems Biology/Microbiology Faculty Search
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To Whom It May Concern:

I have known Dr. Guo-Cheng Yuan since 1994 when he entered our chaos group at the University of Maryland. I was his Ph.D. advisor from 1994 to 1999, and we had considerable correspondence on substantial mathematical questions before he arrived in 1994. We have remained in close contact since his graduation. His interests in fields has changed quite a bit since 1999, through ocean and air flow to computational biology/genomics, but mine have followed a rather similar path, so I remain familiar with his work. I am pleased to write a recommendation letter in strong support of his application of a position at your department.

We have many talented students. He has unparalleled skills in solving difficult mathematical problems. I will mention just one example. Identifying the optimal trajectory is one of the most important tasks in dynamic control. Chaotic systems have infinitely many unstable periodic trajectories. An open question is whether the optimal trajectory is periodic, as suggested by numerical simulations. This is a difficult mathematical problem known as the Mañé conjecture, proposed by Ricardo Mañé, who could not prove the problem himself. Guo-Cheng proved a difficult theorem that essentially verified Mañé's conjecture for hyperbolic systems, a special but important class of dynamical systems. It was the first substantial mathematical result of that sort, thereby justifying the utility of periodic trajectories in chaos control in a wide class of dynamical systems. By the time of graduation, Guo-Cheng already had four papers.

Guo-Cheng is one of the few mathematicians who combine superior analytical talent, excellent computer skills, and broad scientific knowledge including statistics, biology, and physics. He works quite independently. He is an active questioner, a creative thinker, and a cooperative colleague. He enthusiastically throws himself into whatever he undertakes. In the past, he has communicated extremely well with scientists with different backgrounds and creatively applied his unique talent to break new grounds. As an example, traditional methods for investigating ocean transport are inconsistent with the underlying dynamics and significantly underestimate the magnitude of transport activities in chaotic regions. Guo-Cheng and his colleagues pioneered a stable manifold approach to computationally identifying regions with active transport and
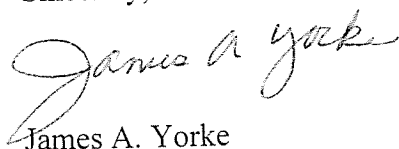
mixing activities in ocean flows. His method not only provided a dynamically consistent framework for understanding the ocean transport mechanism but also offered lights into the chaotic behavior in ocean dynamics. Their results have been published in a highly prestigious journal in oceanography.

Guo-Cheng is an effective teacher in classrooms. I sat in his classes when he taught calculus at the University of Maryland. His lectures were clear and easy to follow. He engaged students to active questioning and discussions and steered them toward the correct approach to mathematical problems.

Guo-Cheng is modest, pleasant, and dependable. He is well-liked by his classmates, professors, and colleagues.

In short, Guo-Cheng is an exceptionally talented scientist. I strongly recommend him for any position without any hesitation. I am sure that he will be a valuable addition to your department. Please do not hesitate to call me if you need further information.

Sincerely,

James A. Yorke
Distinguished University Professor of Mathematics and Physics