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Dear Search Committee Members:

It is a pleasure for me to write this letter in support of Dr. Stefano Boccaletti's application for the tenure-track position in the School.

I have known Stefano and discussed research problems with him over the past ten years or so. I have listened to lectures by him at conferences, and invited him to give seminars at the School of Physics at Georgia Tech and at the University of Maryland. I am not familiar with the entire range of his work by any means, but do know quite well his research on adaptive control of chaotic systems, on synchronization of chaotic systems, and some of his work related to pattern formation in nonlinear optical systems.

Stefano is one of Professor F. T. Arecchi's best students, and has shown great independence and creativity after finishing his Ph.D in 1995, though he maintains close ties with his mentor. I believe that his contributions are key in much of the joint recent work that they have published. Also, in the past couple of years, he has collaborated with experimental groups in Spain as well as with theorists (Professors Celso Grebogi, Y.-C. Lai, Juergen Kurths, George Hentschel and Lou Pecora.) elsewhere.

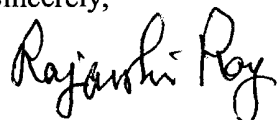
His paper in 1997 (*Chaos* 7, 621) sums up their major research results on adaptive control of chaotic systems. This research introduced a major new idea in the control of chaotic systems – feedback corrections were made not at equal time intervals, but at variable intervals depending on the extent of time evolution of the system. Stefano developed this basic notion into a series of practical algorithms that were applied and tested on a variety of systems, both numerical models and experimental systems including CO<sub>2</sub> lasers. He further applied these control strategies to hyperchaotic systems and spatially extended systems and developed applications to the synchronization and identification of chaotic systems. Another major area of research for Stefano has been that of optical pattern formation and selection. He has studied problems involving photorefractive media, systems with focussing nonlinearities, and also explored the dynamics of patterns in passive and active optical systems.

A characteristic approach that he has taken is to enter quite deeply into research on a given topic and then publish a comprehensive review of the research in the field. Stefano has very recently written three major reviews, one on pattern formation in nonlinear optics, and two on the control of chaotic systems and their synchronization, in Physics Reports. These are well organized and clearly written and will be useful to the scientific community for many years. He has also guest edited issues of Chaos and the International Journal of Bifurcations and Chaos on synchronization and control of chaotic systems. He is very well versed with the literature in nonlinear dynamics and optics, and I believe he would be an excellent resource in a department where people are interested in a wide range of science and engineering, from basic theory to applications. Examples of his interest in applied problems is his recent work on signal dropout reconstruction with Professor Celso Grebogi and his colleagues in Spain, and on synchronization with Professor Juergen Kurths in Potsdam and Dr. Lou Pecora at the Naval Research Laboratory..

I find him highly interactive as a person and am sure that he would form active collaborations with theorists and experimentalists in any institution that he joins. Stefano has worked closely with experimentalists, first in Professor Arecchi's group and then with Professors Maza and Mancini in Spain. His versatility in the manipulation of theoretical concepts, combined with his ability to perform numerical computations, as well as his willingness to test ideas on experiments will make him quite unique as a colleague. He exudes a sense of excitement about his research that will be a major element in attracting good students to work with him.

I believe he will be successful in obtaining funding in the U.S.A. He has the drive and enthusiasm necessary to achieve this, as well as the willingness to work coherently as part of a team. I believe Dr. Stefano Boccaletti is one of the brightest young scientists in nonlinear science at this time and we will see much creative work from him in the future.

Sincerely,



Rajarshi Roy  
Director, Institute for Physical Science and Technology  
Professor, Department of Physics and  
Institute for Research in Electronics and Applied Physics