

To: Prof. Rob deRuyter,
Head Biocomplexity Search,
Department of Physics,
Swain West 165, 727 East Third Street,
Indiana University, Bloomington,
IN 47405-7105, USA.
E-mail: deruyter@indiana.edu.

From: Dr. Stefano Boccaletti, Istituto Nazionale di Ottica Applicata, Largo
E. Fermi, 6, I50125 Florence, Italy, Phone: +39.055.23081, Fax:
+39.055.2337755, E-mail: stefano@ino.it

Re: Application for a Senior Biocomplexity faculty position at the College
of Arts and Sciences, Indiana University, Bloomington.

Florence, October 21st, 2003

Dear Professor deRuyter,

with this letter I intend to apply for a Senior faculty position in
Experimental, Theoretical and Computational Biocomplexity and
Biophysics at the College of Arts and Sciences, Indiana University,
Bloomington.

To this purpose, and following the instructions contained in the
announcement for the application, it is my pleasure to enclose a c.v. with
list of my publications, a one page statement of future research interests,
and a one page statement of teaching interests. Furthermore, as requested in
the call, I forward to you the names and coordinates of six colleagues,
whom you may consider to contact for References:

- Prof. Itamar Procaccia (Department of Chemical Physics, The
Weizmann Institute of Science, Rehovot 76100, Israel, Phone
+972.8.9343918, Fax +972.8.9344123, e-mail:
Itamar.Procaccia@weizmann.ac.il)
- Prof. Juergen Kurths (University of Potsdam, Institute for Physics, Am
Neuen Palais 10, PF 601553, D-14415 Potsdam (Germany), Phone
+49.331.977.1429, Fax +49.331.977.1142,
e-mail: juergen@agnld.uni-potsdam.de)

- Prof. Lou Pecora (Naval Research Laboratory, Code 6340.1, Washington, D.C. 20375-5000, U.S.A., Phone +1.202.767.6002, Fax +1.202.767.1697, email: Louis.M.Pecora@nrl.navy.mil).
- Prof. Kenneth Showalter (C. Eugene Bennett Chair in Chemistry, West Virginia University, Department of Chemistry, P.O. Box 6045, Morgantown, WV 26506-6045, U.S.A. Phone +1. 304.293.3435 ext. 6428, Fax +1. 304.293.4904, email: KSHOWALT@WVU.EDU).
- Prof. Rajarshi Roy (Director of the Institute for Physical Science and Technology, Department of Physics, 3347 A. V. Williams Building, University of Maryland, College Park, MD 20742, U.S.A. Phone +1. 301.405.1636, email: rroy@glue.umd.edu).
- Prof. George Hentschel (Emory University, Department of Physics, N232 Mathematics and Science Center, Atlanta GA 30322-2430, U.S.A. Phone +1.404.727.0764, Fax +1.404.727.0873, email: phshgeh@physics.emory.edu).

I kindly ask you to give me acknowledgement that all material has safely arrived in your hands. Please, let me know also if you want I arrange directly with the above colleagues, in order for them to send you letters of References, or if you prefer to contact them yourself.

Thanking you in advance for the attention you will devote to my application, I take the occasion for sending you my

Best Wishes and Regards

Stefano Boccaletti

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STATEMENT OF FUTURE RESEARCH PLANS

In the near future, my main interest is to further investigate on the research lines developed in my previous research experience. In particular my plans include

- a) the theoretical modeling and the experimental realization of pattern formation and competition in nonlinear extended systems;
- b) the study of adaptive strategies for chaos recognition, control and synchronization and the extension of their validity to space time chaotic systems;
- c) the theoretical discussion of quantum classical correspondence for classically chaotic systems, with the definition of suitable indicators for the measurement of the degree of coherence of such systems;
- d) the study of delayed dynamical systems at variable delay, with all possible applications in physics and biophysics;
- e) the extension of the concept of excitability to any dynamical system undergoing an inverse bifurcation in all cases in which the control parameter is itself a function of time, with possible applications in biophysics;
- f) the analysis of migration patterns in ecological extended systems;
- g) the analysis of hidden synchronization states in experimental data from medicine, biology, neuroscience and biophysics.

In the far future, I am interested in all possible research activities related to nonlinear dynamics / nonequilibrium physics to be done in collaboration with other scientists of the place, as well as to establish a collaborative relationship allowing exchanges of mutual interests and skills, for the realization of joint research projects.

STATEMENT OF TEACHING INTERESTS

In my past experience I had the opportunity to teach both at a senior undergraduate (“Applied Mathematics” for the biology career and for the chemistry career, 45 hours course), and at a graduate level (courses on “Signal Analysis and Processing”, “Instabilities and Space-Time Chaos in Nonlinear Optics” and “Control of Chaotic Systems” within the PhD career in Physics at the University of Navarra, at the University of Zaragoza, and at the University of Florence).

For the future, I would be happy to give courses at both levels, including basic physics classes for junior undergraduates.

My main teaching interests in the near future include

- a) basic physics and mathematics courses for junior undergraduates;
- b) advanced courses in nonlinear dynamics, theoretical physics, quantum mechanics, nonlinear optics and fluid dynamics for senior undergraduates;
- c) graduate level courses on pattern formation and competition in extended systems, control and synchronization of chaos and space time chaos, and nonlinear data analysis for students following a PhD in physics, applied mathematics, chemistry, biophysics or engineering.

I am also open to the specific future necessities of the College of Science at Bloomington of providing advanced or basic courses in the Biocomplexity area.