Biocomplexity Faculty Search Committee
c/o Prof. Rob de Ruyter
Department of Physics
Swain West 117
727 East Third Street
Indiana University
Bloomington, IN 47405-7105
USA

17 November, 2003

CONFIDENTIAL: PROFESSORIAL POSITION

Dear Professor de Ruyter,

I have a strong interest in Biocomplexity through interdisciplinary research. I would be interested in contributing to the teaching and development of courses and programs in Biocomplexity.

I am proposing the following grant application for $2 million: "*Mathematical Modeling of volume transmission (VT) following transcranial magnetic stimulation (TMS) of Wernicke's area as recorded with high-resolution electroencephalography (EEG)"* (see attached curriculum vitae).

Sincerely yours,

Roman R. Poznanski, PhD
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TEACHING PHILOSOPHY

My teaching philosophy is to inspire students to reach their true potential by transcending across traditional boundaries and preparing them for a career as a professional in the most general sense, with a firm grounding in the natural, physical, and mathematical sciences. Teaching is a scholarly activity, akin to research. My research endeavor over the years has focused on integrating the natural sciences (biology, physiology, biochemistry, psychology etc.) with the use of mathematics. I aim to achieve this goal in teaching by mentoring students on computational and mathematical models that would allow the students to integrate the natural sciences across hierarchies without the need for animal experimentation. To mentor students in basic mathematical skills in scientific computing for a career as a professional in medicine, research, academia or industry is a privilege which rewards me with a sense of fulfillment. I regard teaching as a welcomed responsibility which compliments my research career and allows me to contribute directly to the educational mission of the University.

Curriculum development of introductory and upper-level courses is very much part of my philosophy in as far as it is most effectively executed if one is working at the cutting edge in one's chosen field. My teaching philosophy is not static; keeping abreast of new knowledge is certainly important; I believe it is my responsibility to read literature on education, education theory, or instructional methods, as well as attend workshops or seminars. I welcome working with peers in a teaching team, collaborating on curriculum development for the most effective results.

The teacher-student relationship is based on cordial respect and integrity. The propensity to transfer knowledge to another human being by mentoring gives a feeling that is not as instantaneously gratifying through research as in a teaching environment. The satisfaction of playing a key role in passing this knowledge to the younger generation are the reasons behind this feeling of bliss, and a sense of vindication of one's achievements as a scientist. Mentoring students that show resilience and perseverance despite temporary difficulties is especially a rewarding experience in itself, as is the satisfaction of mentoring bright students. Undergraduates are more prone to difficulties because of their inexperience. My philosophy is to praise a student who perseveres (who does not give up!) at understanding the knowledge that is presented to him/her for the first time. The most important attribute of any future scientist is 99% perseverance and 1% inspiration which is the motto behind my teaching philosophy.

As a parent, I am very much aware of the need to apply patience and encouragement in working with young people. I would hope that, as a result of my efforts, other parents would be glad that I was their child's teacher.

The traditional lecture-test methods of teaching encourage memorization. I want to go beyond that to critical thinking and behavioral change. Intuition, curiosity, and the will to succeed not necessarily at an exam are important characteristics, I as a teacher would foster in my students. In my lectures, I would ask questions and immediately answer the questions, so that students not only pay attention in class but are capable of understanding important issues not fully disclosed on an overhead transparency. This prepares them for independent research. The majority of students prefer to write down important issues raised rather than interrupt a lecture, especially in larger classes where it is more difficult to reach every student on a personal basis. I would encourage questions after class and encourage students to approach me after-hours. Also, I would schedule regular office hours for students, and I would encourage all students to use e-mail in consultation.

The most important element in learning is active participation by the student. A student will learn more when it is clear that he/she is an important and active part of the process. To help achieve this, my students will be encouraged to pursue independent research through perusal of the course syllabus at the onset of the course. That way after each lecture the ability to comprehend the material and to ask questions will be a lot easier. My best attribute both as teacher and a researcher is my passion for achievement. Students will feel inspired if the material is presented to them in a competent manner by a world class researcher, well

organized and prepared. Examples, such as handouts of worked examples, copies of extracurricular reading material, and computer exercises are vital for the student to become an independent researcher.

I have very firm beliefs that every graduate student (MS, PhD) is a unique individual and special care is required in mentoring such students. I will not attempt to train nor encourage graduate students to be clones of me either from a theoretical or substantive perspective. I will encourage students to reach out to explore new ideas and new theories. A general approach which emphasizes the importance of the interrelationships of interdisciplinary thinking is critical element in my approach in training graduates. This requires an appreciation and knowledge of a wide variety of other disciplines. For example, I have long believed that computer and mathematical training can be useful for biology students. For this reason, I feel comfortable and even prefer graduate students who have undergraduate or other training in different disciplines including mathematics/statistics, engineering, physics, chemistry, etc.

Graduate students should be capable of self-direction and self-motivation. They should be capable of taking small tasks at first and larger one later and carrying out these tasks without very close supervision from me. If they are to become successful professionals, self-discipline and self-direction are essential characteristics. I aim to give graduate students as much freedom as they will take, while at the same time I welcome questions, and I do like to work with students to whom I must say: now do this, now do that - at the specific levels. For this reason, I work better with younger graduate students who have not as yet developed a greater sense of independence. I must add that I also like to work well with graduate students from disadvantaged backgrounds. I have the patience that this demands. I can give instructions well the first time, the second time, and succeeding times. However, in the long term both undergraduate and graduate students must be capable of doing quality work - on their own - if they are to succeed in a professional career. They must be free standing, independent professionals. This is a testament of a successful teacher.

Examples of possible teaching courses:

Undergraduate:

1. Introductory Courses in Quantitative Methods for Biologists
   (i) Calculus
   (ii) Scientific Programming I- FORTRAN
   II- Applications with MATHEMATICA
   (iii) Introductory Computational Methods
   (iv) Applied Differential Equations

2. Upper-Level Courses in Mathematical Methods for Biomathematicians
   (i) Advanced Computational Methods
   (ii) Fourier Series and Partial Differential Equations
   (iii) Operational and Green's Function Methods
   (iv) Nonlinear Dynamical Systems
   (v) Perturbation Methods

Graduate:

3. Neurobiology and Neural Networks
   (i) The visual system
   (ii) Networks: theory and applications to neuroscience functions
   (iii) Current literature in computational/mathematical neuroscience.
   (iv) Cognition and systems neuroscience