



Howard Hughes Medical Institute
Research Laboratories

Axel T. Brunger, Ph.D.
Investigator
December 1, 2004

Biocomplexity Faculty Search Committee
c/o Prof. Rob de Ruyter van Steveninck
Department of Physics
Indiana University
Swain Hall West 117
Bloomington, IN 47405-7105

Re: recommendation for Dr. **Michael Brzustowicz** for the opening in your Department

Dear Committee Members:

This letter is in enthusiastic support of Dr. Michael Brzustowicz' application for the position of Assistant Professor in your Department.

Dr. Brzustowicz has been working in my laboratory on studying the structure of uni-lamellar lipid vesicles by X-ray scattering using both low and wide angle data. As is well known, the low angle data can be used to provide information about the overall size and shape of the vesicles. Dr. Brzustowicz realized that the wide angle data provides useful additional information about the composition of the membrane, such as, membrane thickness and electron density distribution. He then developed analytic models of vesicle membranes to simultaneously fit both the low and wide angle data. To my knowledge, Dr. Brzustowicz' method is unique in that it uses both low and wide angle scattering regimes. He also studied the influence of other factors, such as cholesterol and phospholipids composition, on vesicle membrane structure. Ultimately, he hopes that his technique could provide valuable information about the influence of membrane proteins on vesicle membrane structure. Indeed, he has recently obtained very encouraging results using a protein that has been suggested to interact with phospholipids. Dr. Brzustowicz' results indicate that this protein is indeed able to interact with vesicles. It is also hoped that information about the penetration depth and orientation of the protein on the surface of the vesicle could be obtained from X-ray scattering data.

Dr. Brzustowicz has extensive background in scattering theory and X-ray experiments. He has the analytical skills necessary to develop sophisticated mathematical models to match the experimental data. He is therefore in an excellent position to pursue the projects that he has described in his research proposal, which he conceived entirely independently with only minor input from my side.

Dr. Brzustowicz is a talented biophysicist with a keen interest to apply his knowledge to the field of membrane biology and membrane proteins. Considering the heterogeneity and flexibility of membranes, X-ray scattering experiments are most appropriate to provide insights at the composition and shape of the membranes. I therefore expect Dr. Brzustowicz' research to produce exciting new results in the field of membrane biology.

Dr. Brzustowicz has demonstrated significant independence in conducting research while in my laboratory, so I expect that he will do well when launching his own independent research group. He has been a good lab citizen and team player, often assisting others in the laboratory with mathematical and analytical insights. In research talks and lectures he has demonstrated his ability to explain complicated mathematical models with appropriately intuitive arguments, so I expect him to perform well in the formal setting of class room teaching. Dr. Brzustowicz has already gained some experience in grant preparation by successfully applying for synchrotron data collection time at a number of institutions.

In summary, I believe Dr. Brzustowicz will perform well as junior faculty member in your Department. Please do not hesitate to contact me if you need further information.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Axel T. Brunger". The signature is fluid and cursive, with the first name "Axel" being the most prominent.

Axel T. Brunger

Investigator, Howard Hughes Medical Institute
Professor of Molecular and Cellular Physiology,
Neurology and Neurological Sciences, and
Stanford Synchrotron Radiation Laboratory