

SCHOOL OF SCIENCE



December 10, 2004

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

RE: Michael R. Brzustowicz
Letter of recommendation

Dear Professor de Ruyter van Steveninck,

I am pleased to recommend Mike Brzustowicz's application for a tenure-track assistant professorship in your department.

Mike joined the Graduate Program in the Department of Physics at IUPUI in the fall of 1996 after receiving a BS in engineering physics from Lehigh University. He had been attracted by the opportunities offered in biophysics, and chose to work under my supervision utilizing solid state NMR methods to elucidate lipid organization and peptide conformation in model membranes. Mike launched into research with great enthusiasm and quickly became an indispensable member of my group. In the laboratory he was creative, constantly trying to improve experiments and coming up with new ideas.

Upon successful completion of his MS in the summer of 1998, Mike transferred to begin PhD studies that he completed in the fall of 2001 under my supervision in the Medical Biophysics Program run jointly by the Schools of Medicine and Science at IUPUI. The transfer undoubtedly represented a wise choice that I encouraged. He truly wished to apply his background in physics to biological problems and excelled in the interdisciplinary biophysical component of his course work.

Solid state ^2H NMR investigation of the effect of acyl chain polyunsaturation upon the molecular organization of $[3\alpha\text{-}^2\text{H}_1]\text{cholesterol}$ within membranes was the central focus of Mike's research. It is hypothesized that the high conformational disorder of PUFA (polyunsaturated fatty acids) interferes with

DEPARTMENT OF PHYSICS

LD 154
402 North Blackford Street
Indianapolis, Indiana
46202-3273

317-274-6900
Fax: 317-274-2393

INDIANA UNIVERSITY
PURDUE UNIVERSITY
INDIANAPOLIS

SCHOOL OF SCIENCE



insertion of the rigid steroid moiety into the bilayer. His results unequivocally establish that substitution of polyunsaturated for saturated chains reduces the order and greatly diminishes the solubility of the sterol. They constitute the first direct observation in favour of recent proposals of lateral phase separation within membranes into cholesterol-poor/polyunsaturation-rich and cholesterol-rich/polyunsaturation-poor microdomains on the basis of affinity for cholesterol. A potential role for PUFA in modulating the composition of lipid rafts, sterol enriched regions that serve as the platform for signaling proteins and have attracted tremendous interest of late, is one implication

Mike applied other biophysical techniques to complement his NMR work. Collaborative x-ray diffraction experiments performed with Martin Caffrey's group at Ohio State University, in particular, both confirmed the NMR determination of low solubility for cholesterol in dipolyunsaturated membranes and identified the excluded sterol to be monohydrate crystal. Mike was also involved in initiating neutron scattering studies with John Katsarras at NRC Canada to test a proposal that cholesterol resides near the centre of polyunsaturated membranes in a "cholesterophilic" region where single C-C bonds predominate. His willingness to synthesize $[3\alpha\text{-}^2\text{H}_1]$ cholesterol is a further indication of his biophysical credentials. Traditional physicists are loath to even think about organic chemistry!

Three publications on which he is the first author and five others on which he is a coauthor resulted from Mike's PhD work. He also gave numerous talks on campus and at regional meetings, and presented posters at the annual meeting of the Biophysical Society each year 1998-2002. He performs well in public and expresses complex ideas clearly.

I consider Mike to be an excellent candidate with a vision for his own research program. His background in physics is sound and he is well trained in biophysics, credentials that are further enhanced by the experience gained as a postdoctoral researcher in Axel Brunger's laboratory. He has a friendly disposition and successfully interacted with others throughout his graduate studies. The influence of Mike's work on my current research, as reflected by his coauthorship on recently written reviews, is still felt.

I urge you to give serious consideration to Mike's application. Please feel free to contact me for more information.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'S. Wassall', written over a horizontal line.

Stephen R. Wassall
Associate Professor

DEPARTMENT OF PHYSICS

LD 154
402 North Blackford Street
Indianapolis, Indiana
46202-3273

317-274-6900
Fax: 317-274-2393