



DEPARTMENT OF CHEMISTRY
WIESS SCHOOL OF NATURAL SCIENCES

December 8, 2003

Biocomplexity Faculty Search Committee
c/o Professor Rob de Ruyter
Biocomplexity Institute
Swain Hall West 117
Indiana University
Bloomington, IN 47405-7105

To the Selection Committee:

I am writing this letter in support of Dr. Jordan Gerton's candidacy for a faculty position at Indiana University. I have been acquainted with Jordan for several years as he took my graduate course in Molecular Spectroscopy in his second year at Rice. He did very well, and it was a real pleasure to teach him. I was on his thesis committee. His thesis and his defense of it were outstanding.

Although my interactions with Jordan were limited to the two occasions mentioned above, I really like what I saw. He is intelligent, hard working, and responsible. He was the lead author of a letter in *Nature* describing the direct observation of the growth and collapse of the Bose-Einstein condensate of ^7Li atoms. Randy Hulet's group very early observed Bose condensation in ^7Li , but the behavior of the system was quite strange and unreproducible. Over the last few years, the situation has become clear. The scattering length of ^7Li is negative, which implies that a Bose-Einstein condensate of this substance cannot be stable. A condensate would form, but, as its size increases, three body collisions would cause the formation of dimer molecules heating the sample with the collapse of the condensate. It would then begin reforming, after growing for a while, it would collapse again. This process is repeated until the reservoir of non-condensate gas became too small. Because this pulsation is a stochastic process with a distribution of collapse times, unraveling what is going on has been challenging. Jordan's contribution was in developing a laser method for deliberately triggering the collapse so that growth after this triggered collapse and the appearance of a subsequent collapse can be followed systematically. This is experiment required stabilizing the difference in frequency between two lasers to sub-Hz accuracy. Jordan made several other fine contributions to the work of Hulet's group such as the magnetic slow atom selector.

Since he left Rice, Jordan has been working with Stephen Quake at CalTech developing a novel near field microscope capable of significantly better resolution than other instruments. This instrument should be applicable to a number of significant biological problems.

I believe that Dr. Jordan Gerton will be an outstanding faculty member. I strongly support his candidacy for this position.

Sincerely yours,

Robert F. Curl
Kenneth S. Pitzer-Schlumberger
Professor of Natural Sciences