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Biocomplexity Faculty Search Committee  
c/o Prof. Rob de Ruyter van Steveninck  
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To Whom It May Concern

This letter is written in support of Dr. Nathan Oyler's application for a faculty position at your institution. Nathan worked as a graduate student in my group for five years. Nathan generally worked in the field of solid state NMR methods development. In particular he worked on the development of improved NMR techniques for measuring static homonuclear dipolar couplings in the midst of magic angle spinning (MAS) experiments. MAS improves the resolution of solid state NMR spectra by removing or greatly reducing the anisotropies of second rank magnetic interaction tensors...including both the chemical shift anisotropy and the direct dipolar interaction. The former interaction requires extensive computation to relate it to local protein structure and its suppression is generally an experimental goal, while the latter interaction is prized as a direct measure of the inverse cube of inter-nuclear distances. Dipolar recoupling refers to the general approach of applying sequences of radio frequency pulse pulses in the midst of a MAS experiment to selectively counter the averaging effect of the sample rotation on the dipolar interaction while still achieving reduction or complete suppression of the chemical shift anisotropy.

Basically, Nathan Oyler worked while in my group on optimizing the performance of dipolar recoupling experiments and adapted dipolar recoupling techniques to the preparation and detection of multiple quantum states. Multiple quantum MAS experiments...also called double quantum CSA by Robert Tycko, is one of the primary methods that solid state NMR spectroscopists use to measure torsion angles, and Nathan's work was one of the first papers published on this subject. As a direct extension of his work, Nathan used multiple quantum experiments to determine CSA tensor orientation in crystalline peptides and nucleotides. In addition, he composed a software package for analyzing dipolar recoupling experiments that is still in wide use.

Graduate students fall into three general categories in my group; students who work on 1) problem-oriented or applied research...measurement of molecular dynamics in protein nucleic acid complexes, structure of biocomposites, etc. 2) development of NMR techniques; 3) development of NMR technology. Nathan Oyler definitely worked in the category 2 and to a lesser degree in category 3. However, having followed his progress with Robert Tycko at NIH, I

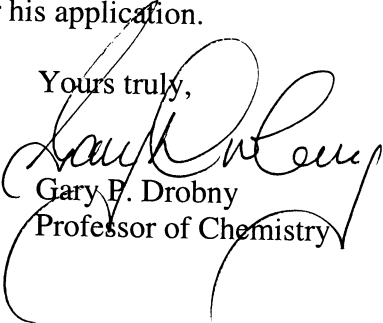
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find that Nathan not only continued to develop NMR methods but also has become familiar with structural studies of amyloid proteins.

I believe that Nathan Oyler shows the same promise as the best methods-oriented grad students from my lab including Todd Alam and David Gregory, both of whom work in NMR labs in industry. Nathan is more knowledgeable in spin physics and has a stronger background in NMR methods than Joanna Long, who was postdoc in my group, and is now an assistant professor at the University of Florida.. Nathan does not have the background in peptide chemistry possessed by Joanna Long, however. Nathan's background most closely resembles that of Manish Mehta, who worked with Kurt Zilm at Yale before joining my group as a postdoc. Mehta is now an assistant professor at Oberlin.

In summary, having augmented his work in my lab with a successful postdoc in Tycko's lab, Nathan Oyler has now the potential to successfully initiate a NMR program at a research university. I suspect Nathan will propose to use NMR to study protein aggregates, biomaterials, or some other system intractable to X-ray diffraction or solution NMR. If your institution has a view to start a NMR program in such areas, I doubt very much a better qualified candidate than Nathan Oyler can be found. I recommend you seriously consider his application.

Yours truly,



Gary F. Drobny  
Professor of Chemistry