UNIVERSITY of PENNSYLVANIA

School of Arts and Sciences
Department of Physics and Astronomy
Philadelphia, PA 19104-6396
(215) 898-6354 / Fax: (215) 898-2010
yodh@physics.upenn.edu

Arjun G. Yodh
James M. Skinner Professor of Science

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

Re: Recommendation for Andy Lau for position of Assistant Professor

Dear Professor de Ruyter van Steveninck,

It is my pleasure to recommend Andy Lau for the faculty position now open at Indiana University. Andy has been at Penn for about two years. He has worked assiduously within our soft theory group (which is led by Tom Lubensky, Randy Kamien, and Phil Nelson), going after problems often stimulated by local experimentalists. I have been very impressed by his efforts. He has distinguished himself. Since I am not a theorist, I will leave discussion of his theoretical strengths to his theory advisors (i.e. Tom Lubensky and Phil Pincus). Instead I will elaborate briefly on a few of his accomplishments and attributes that have directly affected me.

My first significant interaction with Andy came after I had given a colloquium at Penn in connection with our work on entropic interactions and self-assembly. We had been investigating the attractive entropic interactions between colloidal spheres induced by rods in suspension. Our data agreed with existing theory at long range, but failed at short range. Andy approached me after my talk and suggested the short-range effect was due primarily to rotational degrees of freedom of the rods; effects not accounted for in earlier theories. In our experiments we used fd-virus as 'model' rods, but fd-virus is not perfectly rigid. Thus I was excited about his ideas. He quickly devised a method to compute these effects, and very shortly thereafter we were using his analytical results to understand our data. The rotational degrees of freedom of the semi-flexible rods were important at short range, and actually provided a way to derive the persistence length of the rods from our interaction measurements. Agreement between experiment and theory was terrific, and so we wrote a paper about it (in PRE)!

Our next interaction involved a completely different experiment in my lab. In this case we had been trying to understand how semi-flexible polymers behave in nematic solvents. Basically we had found that polymers elongate in the nematic solvent, and that their tangent-tangent correlation functions change profoundly compared to isotropic solvents (and even

compared to isotropic solvents immersed in an aligning electric and magnetic fields). This was the end of the line for us, but Andy was able to take some existing theory (i.e. in old papers by Kamien and David Nelson), and extend it to generate the correlation functions for our systems. It was critical in this case to include the 'back-reaction' aligning effect that the polymer has on local director ordering in the nematic solvent. We have written up this paper and sent it off for review in PRL. Andy played a critical role in making it fly.

In a similar spirit Andy began working with Tom Lubensky and John Crocker (PENN, Chemical Engineering) on a problem in microrheology, stimulated by John's measurements in living cells. He quickly grasped the essence of the problem, and together they have used measurements plus new theory to understand the fluctuation spectra of mechanical forces in the cell, --- the noise bath is non-thermal. He has now stimulated our group to carry out related experiments with spheres and bacteria in order to study non-thermal noise in a much deeper and more controlled way.

Andy is a self-starter. He is quick to try out ideas. He is highly interactive, and he does not always think "in the standard box." He has chosen a vital and scientifically fertile field, soft condensed matter, on which to focus his talents; its participants come from departments ranging from Physics to Chemical Engineering to Biology. Thus he is likely to thrive in interdisciplinary environments. He certainly ranks within the top group of young condensed matter theorists I have seen at Penn during by 15 years here (e.g., in job interviews, as post-docs, as weekly seminar speakers). Finally, he has interacted very well with my students and postdocs, and with other faculty at PENN. Members of my group are very fond of Andy; he enjoys discussing physics with us and is often very pedagogical.

I recommend him to you in very strong terms.

Very Sincerely Yours,

Arjun G. Yodh
James M. Skinner Professor of Science