



Princeton University  
Dr. Edward C. Cox

Department of Molecular Biology

Telephone: 609 258 3856  
FAX: 609 258 1343  
email: [ecox@princeton.edu](mailto:ecox@princeton.edu)

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Yves Brun  
Systems Biology/Microbiology Faculty Search  
Department of Biology  
Indiana University  
Jordan Hall 142  
1001 E 3rd Street  
Bloomington, IN 47405-7005

Re: Ido Golding

To the Members of the Search Committee,

It gives me great pleasure to recommend Ido Golding for a position in your Department. He is exceptional, and exceptionally well suited to a career in a University: He is one of the top two PostDocs I have trained in a group of 50 or so; he has great intellectual and physical energy; he is creative, with good taste in problems; he has made the transition from physics theory to molecular and cell biology with ease, while at the same time using his training in condensed matter theory to advance our understanding of cellular systems; and he is a superb, even gifted, student mentor, and a fine colleague. Any Department that can attract him will be fortunate.

Ido is in his fourth year at Princeton, having been selected as a Lewis Thomas Fellow from a very competitive field of candidates. LTL Fellows have considerable freedom to choose projects and labs to work in, somewhat like Whitehead Fellows at MIT. He began his work here with no laboratory experience whatsoever, but was very quickly in the lab, learning all of the techniques of genetics and molecular biology, and applying them to questions of regulatory networks in simple systems, where he could combine his ability to model with experimental data. He is thus one of the new but still small group of young physicists who have both highly refined modeling skills, and the ability to work productively in the laboratory. He quickly focused on a classic problem in biology, the consequences of stochastic events in single cells, and in particular, on where and when individual RNA transcripts are synthesized. As you can see from his publications, he was the first to study and quantify single mRNA molecules as they are made in individual living bacteria. This was technically demanding, and in his first paper in the *Proceedings*, he established that he could quantify single molecules, watch them as they were made, and then begin to model how they moved in the cell. He has now extended this work in two directions. In his *Cell* paper, he reports on individual and highly stochastic bursts of mRNA synthesis—a new result—and demonstrates that the noise in the system is primarily extrinsic to RNA synthesis itself. In a third paper, now ready for submission, perhaps to *Phys Rev Letters*, Ido shows that the movement of newly completed RNA molecules follows sub-diffusion

dynamics. This result begins to tell us something new about the bacterial cytoplasm. In addition to these papers, which are entirely his own, he made substantial intellectual contributions to a *Proceedings* paper with Wang *et al.*, a collaboration I have with Bob Austin in Physics, and he did the intellectual heavy lifting in the *PLoS Biology* paper, on which he is second author.

What has continued to impress me about Ido is his ability to combine many different ways of thinking in a highly creative way. When he started here, his experience was entirely in theory, and yet he is a natural in the lab—good hands, as they say, and a hard worker. He quickly learned the standard cell and molecular tools that we use, constructed many quite complicated genetic circuits with little fuss, and then developed high-end image gathering and analysis techniques for single molecule analysis. For the *Cell* paper, one of the referees asked for more information on how we automated our image analysis, saying that “I have been doing this for many years and the authors approach is new to me”. After our first paper, Ido revealed another side to his character by being completely open and generous with the reagents he has constructed, and in helping others establish his system in their laboratories. He understands how science advances and wants to see it happen.

Throughout this period of training and experiment Ido has interacted with a wide variety of people within this Department and in our Physics Department. He likes to talk science, and he likes to help others. By temperament, he tends to think the best of people. Not surprisingly, a corollary of this talent is his gift for advising others, undergraduates, graduate students, and technical help. He manages to combine patience with a rigorous questioning approach to understanding and refining data. This will stand him in good stead when he has his own research group.

Importantly, if you are looking for someone who has truly made the transition from physics theory to molecular biology whilst continuing to use the modeling skills he grew up with—a very small group, in which I would include Michael Elowitz and Phillippe Cluzel who now have their own labs, and Uri Alon, who is much farther along, all of who I knew well when they were at Princeton—I can't think of a stronger candidate.

In sum, I have absolutely no reservations about Ido's creativity and commitment to science. He is an exceptionally hard worker, he is independent, and I have no doubts about his abilities as a creative scientist, teacher and research mentor. He is a winner on all counts.



Edward C. Cox  
Edwin Grant Conklin Professor of Biology  
Professor of Molecular Biology