

January 6, 2004

To Whom It ~~May~~ <sup>Rob</sup> Concern:

I am writing to recommend Rahul Kulkarni for a faculty position in your department. Rahul joined me and Chao Tang at NEC's Lab in Princeton in the Fall of 2002. Rahul stood out among a large field of postdoctoral applicants because of his abundance of energy and initiative, and we were delighted by his decision to come to NEC.

Rahul began working with us on the co-evolution of DNA binding proteins and their preferred binding sequences. In pursuing this work, Rahul very quickly became the group's expert in bioinformatics. Using a clever iterative scheme, Rahul was able to start with a set of binding sites for a particular protein in one organism, and identify the binding sites for the corresponding protein in other organisms. A surprising result from this work was an evolutionary interchange of the regulatory role of the arginine repressor. More generally, this approach provides a unique window onto the evolution of regulatory networks.

Rahul's expertise in bioinformatics has led him into very fruitful collaborations with experimental groups at Princeton. Rahul has been extremely proactive in these interactions, and has become the driving force behind a number of experiments. In particular, he has been working with Bonnie Bassler and her group on quorum-sensing, i.e. cell-cell signaling networks, in bacteria. Using regulatory information and genomic comparisons, Rahul was able to identify a set of small RNAs that form an essential part of the quorum-sensing pathway in cholera and related species. Bonnie told me that she had hired an experimental postdoc to find these sRNAs, and expected the project to take a year. Rahul found the sRNAs in a few weeks. Importantly, this was just the start of Rahul's involvement with Bassler's group. He has invested a great deal of time and energy learning the relevant biology, so that he can synthesize data from genetics experiments, cell physiology, and bioinformatics into an emerging picture of how the information stream from cell-cell signaling is processed. He will give an invited talk about this work at the upcoming American Physical Society March Meeting in Montreal.

Rahul indeed has a great deal of energy and initiative, and seems to thrive on interactions. In addition to his major direction in bioinformatics, he has collaborated on a number of other projects with group members, including analysis of gene-expression data and the chemotaxis network. Rahul is also finishing up a paper on his elegant analytical treatment of pattern formation by an intracellular spatial oscillator in *E. coli*. This last work was done in collaboration with me and a student based on an ongoing project, but the idea for an analytical study of a tractable model system was entirely Rahul's.

Rahul is one of a very small group of theorists who combine a strong foundation in physics, or other quantitative science, with a real love and appreciation for biology. With his creativity, his drive, and his ability to work productively with experimentalists, I predict Rahul will become a major player in genome-era biology.

Sincerely yours,

  
Ned Wingreen

Senior Research Scientist