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Biomedical Computation Space



Looking back at some of the intellectual achievements of the last half century, it is clear that humankind has made tremendous progress in many areas, but arguably none more so than in the two areas of biomedicine and computational science. It is remarkable to consider that slightly more than 50 years ago the structure of DNA was unknown and the modern computer was yet to be invented. Since then, fundamental knowledge in these two fields has grown exponentially. But only recently have these disciplines' trajectories begun to overlap. Their confluence, broadly referred to as biomedical com-

putation, now covers an extremely wide swath of the intellectual landscape, broader than existing areas such as biomedical informatics, biomathematics, computational biology or systems biology. Because it is so diverse, defining biomedical computation is very challenging but I will attempt to do so:

There is much to be gained by examining the threads of commonality in biomedical computation space.

Biomedical computation is investigation in biomedicine across all time- and length-scales, ranging from basic questions about molecular biology to problems in clinical medicine to population-level issues, using computational methods where algorithms play an essential part in the investigation.

Of course, this problem/solution space description is an oversimplification since neither axis can be described along a single linear variable. Although biological structures can be defined by their spatial scale, there are clearly many other variables and hierarchies that describe biomedical problem space. The multiple hierarchy issue may be even clearer in the computational solution space where one would be hard pressed to find a single variable or hierarchy to describe all computational methods that could be brought to bear on biomedical problems.

Biomedical computation space could be viewed simply as the cross of biomedical problem space with computational solution space. This space is characterized by threads of work that span in both directions with biologists and physicians generally investigating the vertical threads and computational scientists generally investigating the horizontal threads.

I believe that there is much to be gained by examining the threads of commonality that exist in biomedical computation space. At times, it may seem abstract or tenuous at best to look for similarities among these very diverse topics but when we do make these seemingly far reaching connections, it is invigorating and exhilarating. With the start of this new magazine, we will cover the topics that span this space and affect us all and I hope that you will find this interesting and valuable and will contribute materials for future issues. □

Computational Solution Space

