Developing Computational Cell Models

Peter Karp
Director, Bioinformatics Research Group

CURRENT RESEARCH

Creating centralized databases for biological information and developing tools for efficient access

In 2013, 1.1 million new scholarly articles in the life-sciences were added to the National Library of Medicine's PubMed database. How can scientists assimilate these exploding amounts of scientific data and knowledge? Put simply, they can't. To realize the full potential of scientific knowledge, the information from those thousands of traditional publications should be coalesced into computable biological knowledge bases. Dr. Peter Karp of SRI International is working to create a modern digital infrastructure for biological knowledge that captures knowledge in both a computable form, and in the form of online scientific encyclopedias. Furthermore, because a computational model of an organism can be developed using a pathway knowledge base for that organism, such knowledge bases not only save scientists large amounts of time by providing concise presentations of information distilled from thousands of publications, but also allow computers to undertake large-scale systematic analyses of these data that are beyond the capacity of the human brain. Dr. Karp is making biological data more centralized, organized, and most importantly, computationally accessible, to accelerate science.

As the Director of the Bioinformatics Research Group at SRI International, Dr. Peter Karp has established two highly-used knowledge bases whose contents were distilled from tens of thousands of scientific articles. For example, his MetaCyc database describes 2,200 metabolic pathways and 12,000 metabolic reactions distilled from 43,000 publications. MetaCyc is part of a larger collection of 5,500 knowledge bases for organisms with sequenced genomes. The knowledge bases use artificial intelligence techniques to capture data that...

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AFFILIATION

Stanford Research Institute

EDUCATION

- Postdoctoral fellow in National Center for Biotechnology Information 1990,National Library of Medicine, National Institutes of Health
- Ph.D. in Computer Science 1989,Stanford University
- B.A. in Natural Science 1982,University of Pennsylvania

AWARDS

- Fellow, American Association for the Advancement of Science
- Fellow, International Society for Computational Biology, 2012
- Fellow, SRI International, 2008
- Phi Beta Kappa, Summa Cum Laude, 1982

RESEARCH AREAS

Metabolic / Diabetes, Technology, Computational Sciences / Mathematics, IOT, Devices, Data

FUNDING REQUEST

Your contributions will provide Dr. Karp with the ability to hire professional biologists who will curate a human metabolic knowledge base and metabolic models for many human diseases -- from cancer to neurodegenerative diseases -- which will direct scientists through the enormous complexity of available data. Dr. Karp's work on EcoCyc has shown that such databases and models will be heavily used by scientists and are crucial for the scientific enterprise.