

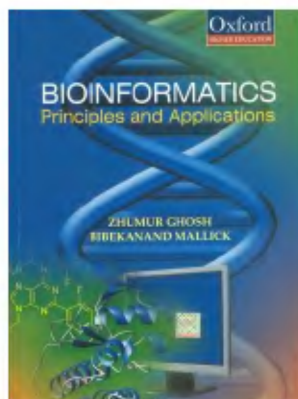
to contaminate muffins and donuts with *Shigella dysenteriae* cultures. Anthrax spores have been most widely used. A form of BT currently being practised by some environmental activists in destroying the field experiments, glass-houses and laboratories of public and private institutions engaged in genetic engineering experiments, is missing in the book. Recently, animal lovers have attacked scientists using animals in their experiments.

The important issue of dual-use technologies and products is briefly discussed; it is difficult to make such distinctions in biological sciences. I recall a personal experience: I had approved the import of agar for a plant tissue culture project in a country under UN sanctions. However, the same was not allowed by the higher authorities as agar-solidified media can be used to grow microbes for BW. Indian scientists in the past have faced similar problems regarding laboratory equipment from foreign suppliers.

Overall, the book brings out valuable biosecurity perspectives for the benefit of researchers in biological and agricultural sciences. I missed two things in this book; first an index and second, an action plan. Only one well-written paper deals with biological weapons. Certainly there is more information and preparedness in the country, though it may not be in public domain. Lastly, any organization is as good as the personnel manning it at different levels – not only the leadership that sets the goals. At a time when science is not attracting the best of the brains, and agriculture remains low on the list of professions for youngsters, it would not be easy to attract bright persons to work in a not-very-glamorous area of agriculture biosecurity and AT. The restrictions on publishing new findings may be another disincentive. Perhaps, some of the best molecular biologists/virologists/biochemists working in leading national research institutions can be invited to join the network. With their insight into the molecular mechanisms, devoting just 10% of their time towards BT and AT can bring critical inputs for rapid progress to a national cause.

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**Bioinformatics: Principles and Applications.** Zhumur Ghosh and Bibekanand Mallick. Oxford University Press, 1st Floor, YMCA Library Building, Jai Singh Road, New Delhi 110 001. 2008. 536 pp. Price: Rs 365.

#### Stew much

A duck once met a porcupine; they formed a corporation  
Which called itself a Porcuduck (a beastly conjugation!).  
A stork to a turtle said, 'Let's put my head upon your torso;  
We who are so pretty now, as Stortle would be more so!'  
The lizard with the parrot's head thought: taking to the chilli  
After years of eating worms is absolutely silly.  
A prancing goat – one wonders why – was driven by a need  
To bequeath its upper portion to a crawling centipede.  
The giraffe with grasshopper's limbs reflected: Why should I  
Go for walks in grassy fields, now that I can fly?  
The nice contented cow will doubtless get a frightful shock  
On finding that its lower limbs belong to a fighting cock  
It's obvious the Whalephant is not a happy notion:  
The head goes for the jungle, while the tail turns to the ocean  
The lion's lack of horns distressed him greatly, so  
He teamed up with a deer – now watch his antlers grow!

Translated by Satyajit Ray from a Bengali poem in *Abol Tabol* by Sukumar Ray.

I thought it will be good to quote the above poem by Sukumar Ray in this review, since one comes across more completely

irrelevant quotes for each chapter in this book. More seriously Sukumar Ray, though he published *Abol Tabol* in 1923, captures an aspect of the spirit of bioinformatics aptly – the ability to construct virtual reality and give the researcher a new perspective. Also, it is easy for purveyors, practitioners and dabblers in bioinformatics to slip from the sense to the 'non'sense. One can find examples of this from student essays to articles in high impact factor journals. It obviously also occurs in books, websites and reviews!

Bioinformatics has grown, and grown in many directions – from the early days of literature information access and sequence analysis to the current 'omics', systems biology and biodiversity applications. No doubt, it has made and will continue to make important contributions in the history of biological understanding of life. Bioinformatics has got integrated so much into biology that even hard-core 'traditional' biologists who called a crab a crab only when it was properly specimened and labelled, nowadays accept and look for the stories and relations that are decipherable from strings of symbols or expressions thereof.

A problem, if one may call it so, arises from the hype and hoopla that the spin doctors put on the ilks of bioinformatics and biotechnology. But that is a factor of our 'market-driven' times of education and research priorities where education is a commodity – the fancier the packaging, the more the takers. Thus, we saw an unprecedented rise in the number of colleges, universities and institutions offering courses of all hues using the new mantras in biology. Equally perplexed students, no doubt financially supported by their parents and well-wishers plunged into these courses, many times to the delight and benefit of those who reaped the dividends. Into all this of course, must come the textbooks which are the wherewithal of learning. The textbook scenario, akin to the courses, exploded at the onset of the 21st century. During the period 1999–2005, one saw a mushrooming of books on bioinformatics from outside and inside our country. Some were masterpieces, like *Bioinformatics – Sequence and Genome Analysis* by David Mount, and *Discovering Genomics, Proteomics and Bioinformatics* by A. Malcolm Cambell, and have gone on to their second editions. Also *Bioinformatics for Beginners* (called earlier 'For Dummies' but renamed for the sensitive Indian market!)

## BOOK REVIEWS

by Jean-Michel Claverie and Cedric Notredame. Closer home, we had books such as *Bioinformatics: Databases and Algorithms* by N. Gautham. At the other end of the spectrum, one had a plethora of books, some of which were gibberish in their approach. Nonsense texts, such as *Abol Tabol* usually exist somewhere between perfect sense, on the one hand, and absolute gibberish on the other. They manage this by performing a balance between elements that seem to make sense and those that do not. Of course, Sukumar Ray did not attempt to call it bioinformatics, and made no pretense of his intentions – to tickle the senses.

For a book published in 2008, Ghosh and Mallick could have done with less hype. It could have done better building on good texts that are available and delving into topical ideas of open access, open sources and also getting a bearing on the burgeoning integration of computational and experimental biology, systems biology, etc. Also, considering that the bioinformatics community in India has grown to have many researchers and publications, it would not have been too difficult to include work done in India for the textbook examples and references. Especially in areas such as gene prediction, protein structures, modelling, derived databases, software, etc. At the end (Appendix IV) there is a fairly exhaustive collection of courses and companies in India, though there are some errors in that section as well.

The book is lopsided and uneven in the level and quality of the material presented – sometimes within a section itself. Some parts are dealt with in agonizing detail, while the essentials are skipped. Many a time the information is mixed wrong – for example mentioning that ‘the Protein Data Bank was established in 1971 by the Research Collaboratory for Structural Bioinformatics, Brookhaven National Laboratories, USA’. The correct information is that the Protein Data Bank (PDB) was founded in 1971 by Edgar Meyer and Walter Hamilton of Brookhaven National Laboratory and the management of the PDB was handed over in 1999 to the members of Research Collaboratory for Structural Bioinformatics. The inexactitude of the details persists and pops up at various places throughout the book, at times with damage to the concepts involved.

There is also the standard confusion between the database and the servers or

those who host it. In the chapter on biological sequence databases, we have subsections on NCBI, EMBL nucleotide sequence database, DNA databank of Japan, Protein identification and resource and Swiss-Prot. Under NCBI, the tools BLAST, Mega BLAST, PSI-BLAST, etc. are discussed. Also, this occurs in chapter 4 of Part II, much before sequence alignment concepts in chapter 6 of Part III. The confusion in the presentation and concepts is peppered throughout the book. In some places, the material seems to have been taken from some help option of a software. For example, under the section ‘Different standard scoring matrices’, we have BLOSUM → Return a BLOSUM scoring matrix, Dayhoff → Return a Dayhoff scoring matrix, etc.

The book would have made for more comfortable reading with better handling of the legends to the black and white figures, which occur earlier and the corresponding colour plates which occur later. This is so, especially, in the chapter on molecular viewers.

Living up to the initial claim about the book catering also to postgraduate students of bioinformatics and to students pursuing DOEACC courses on bioinformatics, there is after each chapter a set of review questions and a list of suggested reading references – though the quality of the questions and references could have been more even.

All in all a book of 536 pages, six parts, 14 chapters along with four appendices and a post-appendix ‘Test your understanding’ section gives enough material for one to spend time sifting through as one grows the desired bioinformatics antlers.

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### **Annual Review of Public Health, 2008.**

J. E. Fielding, R. C. Brownson and L. W. Green (eds). Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, California 94303-0139, USA. Vol. 29. 451 pp. Price not mentioned.

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The *Annual Reviews* have always sought to present recent developments in various scientific disciplines in a concise but comprehensive way that is of interest to

practitioners and researchers of the discipline. The 29th edition of *Annual Review of Public Health* comes packed with several topical issues but with a special focus on climate change.

The threats posed by climate change for human health call for a coordinated and sustained response from a host of stakeholders. While mitigation efforts to reduce or recapture carbon emissions is still top priority, the dismal speed of progress in this front has made it necessary to plan anticipatory and reactive adaptation measures to decrease suffering in the globally warm future. Smith and Haigler’s economic analysis using scoping methods, on interventions to replace biomass with cleaner fuels for indoor use is an example of how even low-income countries can benefit from climate change mitigation efforts. It would have been interesting and useful if an accompanying article reviewed the practical implementation of biogas fuels and evaluated the successes, failures, limitations and challenges.

Existing health impact assessments of climate change are incomplete in that they consider only few health effects or do not include non-climate determinants of health. Uncertainty in making valid predictions over long periods, unavailability of disease burden estimates for many health consequences and difficulties in estimating attributable burdens prohibit comprehensive assessments. Patz *et al.* argue for incorporating comparative risk assessment framework in health impact assessments of global climate change to provide evidence for policy makers. Kovats and Hajat review determinants of morbidity and mortality due to heat waves, which are predicted to become more frequent and severe in the future. Age, economic status, co-morbidity, and housing and environmental conditions are determinants of mortality. The heat wave warning systems set up in European nations are an example of the role of intersectoral coordination in preparedness efforts. Jackson and Shields outline preparedness activities that public health agencies at different levels should take up to ensure efficient services at the time of reckoning.

Obesity is fast becoming the most important public health problem in the developed nations and a set of articles have explored possible causes and solutions. Bleich *et al.* use two methods of energy accounting across various OECD nations