

back to several times, while writing our initial work on biodiversity. Things have changed quite a bit, though, since the late 1980s. Easy-to-use computer software have been developed and they are widely available – for free – on the internet; there are several null and biological models of diversity distribution, and some useful and powerful measures of diversity have been devised. The field of phylogenetics has advanced in bounds, and measures of taxonomic diversity have been improved. A modern reference covering this newly formed territory was therefore in order. Magurran has once again filled this niche with her new book. This is not a formal second edition of her previous book, but rather its evolved version.

The first chapter of the book is a general introduction, but it lists valuable web resources and mostly freely available software that compute various diversity indices and measures that have been developed in the past decade and a half. I would particularly like to draw attention to Robert Colwell's EstimateS (<http://viceroy.eeb.uconn.edu/EstimateS>). It computes most of the popular indices. It is being increasingly used in biodiversity studies and most people will find it indispensable in their data analysis.

Perhaps the most important part of the book is the second chapter. It introduces readers to the fundamental but some of the most informative methods of representing data and fitting models: rank/abundance plots, species abundance models, and the philosophical difference between statistical and biological models. The former class of models statistically describes species abundance and includes, for example, Fisher's log series, log normal distribution and negative binomial. The latter class of models, on the other hand, theoretically explains biological basis of species abundance patterns, and includes niche apportionment models. The chapter includes a whole section on Tokeshi's excellent biological models, developed mainly in the 1990s.

The third chapter concerns measures of species richness, or estimating the total number of species in an area from a sample. It is a good introduction to species accumulation and rarefaction curves, and the use, and pitfalls, of log normal distribution to estimate species richness. A section discusses at length Ann Chao's useful estimators of total species richness. This set of models has been made user-friendly by implementation in EstimateS.

The most popular components of biodiversity estimates are perhaps, richness and evenness indices. These have been discussed widely both because of their use in a range of systems, as well as because they have been widely misused and their meaning and utility have been repeatedly questioned. Chapter four gives reasonably detailed accounts of the oft-used diversity indices, such as log series alpha, Q-statistics, Shannon index, Simpson's index and Berger-Parker index. The diversity of diversity indices itself is quite overwhelming, and a table on page 120 and its discussion on pages 119–121 would prove useful while choosing appropriate diversity indices. This chapter also briefly discusses measures of underappreciated dimensions of diversity: taxonomic diversity and functional diversity. Under-representation of these measures of diversity is unfortunate. Taxonomic diversity is an important consideration in conservation studies. Functional diversity has important implications for the diversity–stability debate on the one hand and community structures, species packing and stability of communities on the other hand. Perhaps the book will be successful in encouraging ecologists and conservation biologists to pay more attention to these aspects of diversity.

Chapters five and six are important for ecologists who study multiple communities and compare them. Chapter five discusses sampling issues at length. There are sections on various methods, such as species abundance distribution, rarefaction and jackknifing. Chapter six is a good overview of beta diversity, or diversity in space and time, and includes an account of cluster analysis. Although informative, it is too brief an introduction to cluster analysis and users of this book will be better off turning to other good books available on this subject for additional reading.

The last chapter 'No Prospect of an End', is somewhat disappointing. It sums up the field and its possible future directions, but rather than being emphatic and visionary it merely serves to end the text. It fails to be stimulating. The chapter is followed by worked examples of the prominent diversity indices and other methods of measuring diversity. Although this section is useful, the reader is advised to refer to much richer and more diverse resources available on the internet.

Despite some shortcomings mentioned above, this is a crucial reference for budding ecologists, conservation biologists,

forest officials and habitat managers. All institutional libraries, major or minor, should have copies of this useful reference. Hopefully, students, more advanced researchers and habitat managers will continue to document, study and conserve India's biodiversity. Of particular interest are quantitative comparisons of species assemblages and monitoring of our biological diversity in relation to management strategies and in the face of threats to biodiversity. Magurran's book has much to offer in these areas, and hopefully we will make good use of it.

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Citation Analysis in Research Evaluation. Henk F. Moed. Springer, Dordrecht, The Netherlands. 2005. 346 pp. Price: US\$ 59.95.

Performance evaluation is important in all organizations. In particular, evaluation is important in the field of science and technology as millions of dollars are invested on scientific research and the impact of research is felt in virtually every sector of the economy.

Ever since Gene Garfield came up with the citation index for science in the early 1960s, he has been writing essays on a variety of topics, often using data from *Science Citation Index*. Many of these essays, since brought out in the form of a multi-volume series entitled *Essays of an Information Scientist*, are state-of-the-art examples of citation analysis-based research evaluation. And the Institute for Scientific Information, the publisher of *SCI*, and later the Thomson group, have brought out many tools specifically to

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help their clients evaluate research performance.

Way back in 1976, Francis Narin of Computer Horizons came up with *Evaluative Bibliometrics: The Use of Publication and Citation Analysis in the Evaluation of Scientific Activity*. Both Narin and CHI were involved in the Science Indicators project of the US National Science Foundation, especially in developing literature-based indicators. Narin's report was largely based on CHI's own work.

In the summer of 1997, the Office of Naval Research, USA, released the seventh edition of *The Handbook of Research Impact Assessment* (DTIC Report Number ADA296021) by Ronald Kostoff. It was a comprehensive document that examined the myriad approaches for assessing the impact of research. The handbook described evaluation of research impact for three cases: research selection, where the work had not yet been performed; research review, where work and results were ongoing; and ex-post research assessment, where research had been completed and results could be tracked. It described retrospective methods (such as projects Hindsight and TRACES), qualitative methods (such as peer review), and quantitative methods (such as cost-benefit analysis and bibliometrics). Dividing the approaches into the three major categories, viz. qualitative, semi-quantitative, and quantitative, Kostoff presented the theoretical background for each approach, as well as illustrative examples.

Much has happened since then, and now Henk Moed, a key figure of the famous Leiden Centre for Science and Technology Studies, has come up with this book, entirely devoted to citation analysis-based evaluation of essentially basic research. This book is written for the scholarly research community and people involved in research evaluation and policy. By policy, Moed means science policy at the national, organizational and departmental levels. Moed has attempted to contribute to the academic basis of evaluative bibliometrics by presenting it as a multidisciplinary scientific-scholarly activity, with its own methodologies and theoretical debates.

The book should be especially useful to practitioners of scientometrics in India, where it seems that everyone graduating from a library school thinks he or she can become an expert in research evaluation overnight. Warns Moed, 'Applying citation analysis in research evaluation in a proper way requires a high level of com-

petence. It is not something that anyone with access to the ISI Citation Indexes can do easily'. Moed provides detailed technical knowledge needed to carry out such studies.

Some micro-sociologists question the validity of citation analysis, but Moed aims to show that citation analysis is a useful tool. He explores the uses and limits of citation analysis and explains the construction and application of a variety of indicators. He examines differences in the structure of written communication systems of different fields of scholarship. After all citation indexes cannot be applied to scholarship in art and music as well as it can be applied to physics and biology. Moed discusses in detail the journal coverage of ISI's databases and tells why raw data from the databases cannot be used straightaway in citation analysis. We need to find alternative databases or develop them, if none exists.

Moed describes four kinds of bibliometric studies; one has to be judicious in deciding which one is suitable in a given context. Moed devotes considerable space to provide a clear understanding of impact factor, need for data accuracy and what citations measure. He also discusses recent trends in developing indicators and touches in passing, citation analysis in an age of electronic information.

On the whole, this is more than a textbook drawing upon years of research the author and his colleagues have done. Moed has also drawn from the research of others and has included a brief note on data accuracy by Garfield.

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It's About Time – Understanding Einstein's Relativity. N. David Mermin. Princeton University Press, 41 William Street, Princeton, NJ 08540, USA. 2005. 192 pp. Price: US\$ 18.95.

The genesis of the theory of relativity has become one of the most enduring legends. In 1905, working in the seclusion of the patent office in Bern, Einstein wrote his celebrated paper 'On the electrody-

namics of moving bodies', proposing his special theory of relativity. The revolutionary ideas contained in that paper, especially the relativity of time, were destined to change radically the world view prevalent at that time. The paper itself is extraordinarily simple. The mathematics employed is no higher than the level at which it is taught in high school. The basic concepts are profoundly simple, especially Einstein's arguments at the beginning of the paper regarding the synchronization of clocks, simultaneity, and the variation of time measure among inertial observers moving with constant relative velocities. These ideas naturally lead to Lorentz transformations that yield unexpected results.

In its simplicity, the book by David Mermin follows in Einstein's footsteps. Mermin is an eminent physicist who has made important contributions to several branches of physics, including condensed matter theory and the foundations of quantum mechanics. His writings are known for their clarity and wit. Furthermore, he has had decades of experience as a gifted teacher at Cornell University. The book *It's About Time* is the outcome of Mermin's successful endeavour to teach relativity to high school students. The mathematics used is just the high school-level algebra and geometry, that too of the most elementary kind. The approach to the physical ideas of observation and deduction is intuitive, although they yield all the counter-intuitive results of relativity.

As a precursor to the different aspects of special relativity to follow, we have here a lucid discussion of the basic idea of relativity. Historically, spatial relativity was formulated by Galileo and was made precise by Newton through his equations of motion. However, time was assumed to be the same for all inertial observers moving with constant relative velocities. The discussion of Newtonian relativity is followed by examples of collision between two billiard balls as viewed from a frame at rest and from a moving frame. The principle of relativity used in the analysis of these examples prepares the grounds for further explorations leading to the rather unusual results of Einstein's relativity as a consequence of time changing among different inertial observers.

Most basic to Einstein's theory of relativity is the speed of light. Mermin treats this important feature of the theory in his characteristic precise and illuminating manner. Once again, after touching upon the historical background of the meas-