Applied NMR Spectroscopy for Chemists and Life Scientists

The book *Applied NMR Spectroscopy for Chemists and Life Scientists*, by Oliver Zerbe and Simon Jurt of the University of Zürich, is a new, comprehensive, and very impressive NMR textbook. It is ideal for introducing students of chemistry, biochemistry, and biophysics to the subject of NMR spectroscopy, and it is equally well suited to become a vade mecum for PhD students who wish to develop or apply NMR spectroscopy to more advanced research projects.

There are a number of excellent NMR textbooks already on the market, and therefore it is a legitimate question whether a new textbook can add anything new. The book by Zerbe and Jurt does that, at an astonishing level. Some people have argued that NMR is now a mature field, and that scarcely any fundamentally new concepts remain to be invented or explored. Nothing could be more wrong than that statement. In fact, over the last 10 years NMR has developed rapidly. The way we now do NMR is fundamentally different from the NMR approaches of ten years ago.

It is exactly this change in methods and technologies that is at the heart of the textbook by Zerbe and Jurt, which achieves that by doing something rarely done: it avoids reproducing concepts that are now outdated. Instead, it includes easily understandable introductions to the new aspects of NMR, such as residual dipolar coupling, paramagnetic NMR applications (e.g., spin labeling), cross-correlated relaxation to understand the TROSY effect, new 3D methods, and methodologies for sensitivity improvement, to name just a few. In other words, nothing that is hot and exciting and important has escaped the attention of the authors, and they provide descriptions based on concepts that are understandable and easy to follow.

Some of the new concepts require novel ways of teaching NMR. A principle that is applied consistently throughout the book is to introduce these new concepts at a level that can be understood by a chemist and a biochemist. I am convinced that the authors' way of thinking about how to teach NMR has been influenced by Malcolm Levitt's seminal book *Spin Dynamics: Basics of Nuclear Magnetic Resonance, Second Edition* (John Wiley & Sons, **2008**). I regard the present book as one that translates Levitt's rigorously presented physical concepts into a form understandable by the non-physics researcher, focusing on the important concepts in a very convincing way.

The book has 548 pages and is divided into five parts: 1) Basics of Solution NMR; 2) Theory of NMR Spectroscopy; 3) Technical Aspects of NMR; 4) Important Phenomena and Methods in Modern NMR; 5) Structure Determination of Natural Products by NMR. Each chapter has a short set of problems, with solutions at the end of the book, and the index provides the appropriate links to the topics in the book.

Reading the book, it is very apparent that the concepts have successfully passed the ultimate test, namely: whether students in Zürich have found the teaching useful. This is certainly also due to the comprehensiveness of the material (theoretical and practical aspects are covered equally well), and the very high quality of the figures. Equations and variables are presented in a consistent manner. Sometimes, where appropriate, historical notes on the development of NMR spectroscopy are included, and this also provides a nice way to emphasize the development of the technique.

Chapter 5 provides an introduction to the applications of NMR to carbohydrates, steroids, peptides, proteins, and nucleic acids. Simply providing well-chosen example spectra of these different classes of biologically important molecules serves as a guide or an appetizer for students interested in entering the field of NMR spectroscopy. Example figures from the literature are added, and appropriate references to additional reading are provided.

In summary, I strongly recommend the book by Zerbe and Jurt as a key reference textbook for teaching NMR in bachelor and master courses in chemistry, biochemistry, biophysics, and bioinformatics.

Harald Schwalbe
Johann Wolfgang Goethe University
Frankfurt (Germany)

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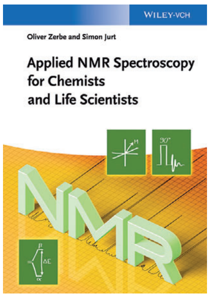

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