When Zhou Enlai, Premier of the People’s Republic of China (1949–1976), was asked his opinion of the French Revolution (1789–1799) he replied “It’s too early to tell”, see Rosenberg (1999). I believe that the same can be said about wavelets. Although particular wavelets were discovered many years ago, the substantial body of literature that we might today call ‘wavelet theory’ began to be established during the 1980s. Wavelets were introduced into statistics during the late 1980s and early 1990s, and they were initially popular in the curve estimation literature. From there they spread in different ways to many areas such as survival analysis, statistical time series analysis, statistical image processing, inverse problems, and variance stabilization.

The French Revolution was also the historical backdrop for the introduction of Fourier series which itself raised considerable objections from the scientific establishment of the day, see Westheimer (2001). Despite those early objections, we find that, 200 years later, many new Fourier techniques are regularly being invented in many different fields. Wavelets are also a true scientific revolution. Some of their interesting features are easy to appreciate: e.g., multiscale, localization, or speed. Other important aspects, such as the unconditional basis property, deserve to be better known. I hope that this book, in some small way, enables the creation of many new wavelet methods. Wavelet methods will be developed and important for another 200 years!

This book is about the role of wavelet methods in statistics. My aim is to cover the main areas in statistics where wavelets have found a use or have potential. Another aim is the promotion of the use of wavelet methods as well as their description. Hence, the book is centred around the freeware R and WaveThresh software packages, which will enable readers to learn about statistical wavelet methods, use them, and modify them for their own use. Hence, this book is like a traditional monograph in that it attempts to cover a wide range of techniques, but, necessarily, the coverage is biased towards areas that I and WaveThresh have been involved in. A feature is that the code for nearly all the figures in this book is available from the WaveThresh
website. Hence, I hope that this book (at least) partially meets the criteria of ‘reproducible research’ as promoted by Buckheit and Donoho (1995).

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\textit{WaveThresh}.

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