Introduction

Prof. Robin Huw Crompton, Editor-in-Chief of *Folia Primatologica* and
Guest Editor of the Special Issue

Why a special issue on biomechanics? Special issues are intended to focus thought on research topics of current importance, and as Editor-in-Chief as well as Guest Editor of this volume I think that it is timely to publish a collection of papers which will, I hope, suggest to primatologists how approaches from engineering and physics can enhance and extend our research. My own career as a field primatologist taught me very early on that locomotor and dietary ecology cannot be understood without reference to the physical principles of body systems which are even in part concerned with the application and sustenance of force. Unfortunately, in our field, with a few notable exceptions, biomechanics is, more often than not, given nothing more than lip service, and the biomechanical aspects of adaptation are addressed only by qualitative guesswork.

Palaeontologists, in particular, seem to have been slow in adopting or even accepting the validity of quantitative biomechanics. However, the mathematics involved is comprehensible even intuitively to primatologists with little or no school mathematics (including myself!), and the computation is readily handled by user-friendly software which produces immediately comprehensible graphical output. As long as Moore's Law continues to be followed or even exceeded, advances in computational hardware will in a couple of years make even today's most challenging biomechanics research projects, which currently require days of time on a supercomputer, feasible using a desktop PC.

The authors whom I invited to contribute include two very senior and well-respected academics, both of whom were early pioneers in applying mathematical modelling to primatology, and three outstanding young scientists of the new generation. We haven't included any papers on predictive dynamic modelling, the specialization of my own research group, as it is now starting to be accepted as a legitimate and powerful research tool in functional anatomy, but modelling – whether finite elements modelling of the distribution of stress in biological structures under load or modelling energy costs of locomotion from accelerometry data gathered from free-ranging primates – is a key topic.

As several of the authors point out, computer models, once verified, are capable of predicting data which otherwise could only be acquired through the kind of invasive research which is unacceptable today unless justified as the only technique available to gather data essential to human or non-human primate welfare. *Folia Primatologica* has taken a strong stand on ethical research, and we are glad to be

able to publish papers which show how primate bone and muscle function and even energy budgets can be studied completely non-invasively, from measurement of contact forces such as foot pressure, using invasive or destructive techniques only on cadaveric subjects which become available as part of the natural turnover of captive and wild populations. It is surely our duty, when privileged to study cadavers or wild populations of animals, to make sure that we extract the maximum scientific information from our data, to offset the damage that even the best-motivated of us inevitably cause when dissecting or carrying out field research. A paper showing how we can calculate muscle capabilities from contact force, motion data and dissection data, and a paper which applies developments in microelectronics to gather information on the motion and activity pattern of free-ranging primates, may be of particular value here.

We hope that this issue will suggest to all primatologists ways in which they can themselves contribute to our knowledge of the biomechanical adaptation of primates, whatever their own core research interests.