The physiological tradition of biological research analyzes biological systems using reduced descriptions much as an engineer uses a ‘black box’ description of an amplifier. Simple models have been used by physiologists for a very long time. Physiologists have successfully analyzed a broad range of biological systems using a ‘device-oriented’ approach similar to the approach an engineer would use to investigate her devices. The present generation views biology through the powerful lenses of structural and (molecular) dynamic analysis, understandably enough because of the beauty and power of the analysis, and the ease of using these structures with present freely available software. The problem is that these powerful lenses offer such magnification that the engineering approach cannot be seen. High magnification means limited field of view, because the (spatial) dynamic range cannot cover everything. The function of the structures and molecular dynamics cannot be seen in the work of many biologists, probably because function cannot be immediately seen in the structures and molecular dynamics they compute. It is just as important for biologists to measure the inputs and outputs of their systems as it is to measure their structures. It seems clear, at least to one physiologist, that this research will be catalyzed by assuming that most biological systems are devices that can be analyzed with the same strategies one would use to analyze engineering devices. Thinking today about your biological preparation as a device tells you what experiments to do tomorrow. An important task for many of us is to transmit the physiological tradition to the next generation of biophysicists to help them adapt traditional questions to the new length scales and techniques of molecular and atomic biology.