SUMMARY

Transduction of forces is ubiquitous in biology: Gravity exerts a stress on all objects, cell motion involves forces between cells and their surroundings, chromosomes are actively separated during mitosis and cell division. It is an important fact, often only implicitly recognized, that these forces originate over a wide range of length scales, from single molecules, to individual cells, to tissues, and to complete organs. Thus, scientists from many disciplines such as biology, medicine, chemistry and engineering, carry out research on biological force transduction. However, for technical and disciplinary reasons, specific projects tend to focus on a narrow range of length scales, such as the molecular scale, the cellular scale or the full organ or tissue scale. The impetus for the Workshop was the notion that it would be useful to address the problem of biological forces, representing many length scales, within a single venue. Such a meeting had not previously been held. Over 100 scientists representing a range of disciplines attended the three-day Workshop. The goals of the Workshop were: (1) To present recent advances in research on biological force transduction, (2) To identify new, interdisciplinary or synergistic interactions that could speed progress, and (3) To make recommendations about resources or mechanisms needed to achieve these opportunities.

Each day included a session of three invited talks in each of the three areas represented at the Workshop: molecular, cellular and tissue research. There were also short contributed presentations from 28 of the participants. Two evening panel discussions were held. One dealt with common research problems, synergies and interactions. The second focused on potential federal funding opportunities, and involved representatives from NIH, NASA and NSF. The Workshop Report provides an **Overview** of the Workshop, a **Summary of Presentations**, and **Conclusions** to guide future work in the area of force transduction in biology.