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Shape and function are intricately related in biology. We present three biological case studies where the goal is to quantify shape change in order to analyze how shape informs function. We will highlight the challenges in analyzing these data sets in the context of the relevant biological applications, and describe shape correspondence techniques developed to handle them.

Case study 1: Using strain to track ferret brain development. Case study 2: Using geodesic distances and an approximate medial axis to track an in-vivo beating chicken heart (peristaltic motion). Case study 3: Shape space based on natural neighbor coordinates for defining bat pinnae and noseleaves. (Received September 11, 2013)