Functional Morphologist Encyclopedia Article

Functional Morphologist

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Functional Morphologist

Functional morphology is a relatively new field in biology. Morphology is the study of the size, shape, and structure of animals, plants, and microorganisms, and the relationships of their internal parts. Unlike anatomy, morphology is not just simple description. It also involves the principles according to which form are related. The organizing principles used by morphology include evolutionary relations, function, and development.

The functional morphologist studies how the shape, or morphology, of an organism or some part of an organism relates to its function. For example, there is a relationship between the shape of a tree and how it is affected by wind. Tall trees grow in protected valleys and can shelter each other. Bristlecone pines, which tend to be small and sturdy, grow where the soil is thin and the wind blows constantly. The form of a bird's wing is related to the speed and manner of its flight. Swifts and falcons are unrelated birds, but both have narrow, sharply pointed wings, ideally suited for rapid flight.

Functional morphologists study motion, support structures, energetics of motion, neural control of locomotion, and motion occurring at the cellular and molecular levels. Fluid flow in cardiovascular systems, fluid flow in respiration, and feeding strategies are all part of functional morphology. Research in functional morphology is multidisciplinary and has applications in ecology, evolution, and medicine.

A functional morphologist will usually have studied biology with a heavy emphasis in anatomy courses as an undergraduate student. Some physics or even engineering courses are also useful. At the graduate level, courses in biomechanics, comparative vertebrate anatomy, comparative physiology, mathematical and computer modeling, and advanced mechanics are necessary preparation for functional morphology, and the student will also specialize in an area, such as fish feeding behaviors or the mechanics of shark movement.

Peregrine falcons have long, slender and pointy wings. Functional morphologists have deduced that the shape of their wings evolved to their present shape to allow the birds to fly quickly.

Bibliography

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