# Biomimetic Robotic Artificial Muscles

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*Biomimetic Robotic Artificial Muscles* presents a comprehensive up-to-date overview of several types of electroactive materials with a view of using them as biomimetic artificial muscles. The purpose of the book is to provide a focused, in-depth, yet self-contained treatment of recent advances made in several promising EAP materials. In particular, ionic polymer-metal composites, conjugated polymers, and dielectric elastomers are considered.

Manufacturing, physical characterization, modeling, and control of the materials are presented. Namely, the book adopts a systems perspective to integrate recent developments in material processing, actuator design, control-oriented modeling, and device and robotic applications. While the main focus is on the new developments in these subjects, an effort has been made throughout the book to provide the reader with general, basic information about the materials before going into more advanced topics. As a result, the book is very much self-contained and expected to be accessible for a reader who does not have background in EAPs.

Based on the good fundamental knowledge and the versatility of the materials, several promising biomimetic and robotic applications such robotic fish propelled by an IPMC tail, an IPMC energy harvester, an IPMC-based valveless pump, a conjugated polymer petal-driven micropump, and a synthetic elastomer actuator-enabled robotic finger are demonstrated.

**Contents:**



**Readership:** Graduate students, academics and professionals in the field of materials engineering and robotics.

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