



Robotic Surgery: Smart Materials, Robotic Structures, and Artificial Muscles

Mohsen Shahinpoor, Siavash Gheshmi

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Robotic surgery has already created a paradigm shift in medical surgical procedures and will continue to expand to all surgical and microsurgical interventions. There is no doubt that in doing so robotic surgical systems, such as the da Vinci surgical system, will become smarter and more sophisticated with the integration, implementation, and synergy of new smart multifunctional material systems that will make surgical tools and equipment more functional in biomimetic sensing and actuation incorporating haptic/tactile feedback to surgeons in connection with kinesthetic interaction with organs during robotic surgery.

This book is the first textbook in robotic surgery to discuss the integration of smart multifunctional soft and biomimetic materials with robotic end effectors to provide haptic and tactile feedback to surgeons during robotic surgery. It is also the first textbook in robotic surgery that comes with a solutions manual, which makes it useful as a supplement to faculty members teaching many different programs and courses such as robotics, medical devices, surgical interventions, and many more.

This book can be adapted by professors to teach graduate students and researchers, to enable them to further employ their creativity and knowledge, and to undergraduates to enable them to get an excellent grasp of this exciting field. It is also useful for individuals interested in the field for self-study. The background required for this book is college-level mathematics, matrix analysis, geometry, and medical/surgical terminologies.

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