Recent Advances in Biomedical Optical Imaging: The Role of Optomechatronic technology

Hyungsuck Cho
Professor Emeritus, Department of Mechanical Engineering
Korea Advanced Institute of Science and Technology South Korea

Biomedical optical imaging field has faced a variety of challenges related to biopsy, retraction of tissues, diagnosis, and surgical operations due to complexity in internal structure and properties of the body and the resulting interacting optical phenomena. Nevertheless, recent advances in biomedical imaging have achieved tremendous increases in the performance of looking inside the body with increased resolution, higher S/N ratio, faster acquisition speed and so on. This achievement is partly due to the contribution of optomechatronic technology, a multidisciplinary technology, which creates new functionalities or creating new systems by integrating optics and mechatronics synergistically need for such performance enhancement.

The presentation will introduce the nature of the optomechatronic technology and discuss its role in solving the optical imaging and viewingrelated domain problems such as tissue imaging, visualization of interior surfaces of organs, laparoscopic and endoscopic imaging for surgery and biopsy, and imaging of neuronal structure and activities. Finally, future prospects and directions for advancing optical imaging technology in biomedical field are presented.