

One-dimensional mechanical sensing systems in biomedical engineering

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Abstract

Healthcare is one of most important issues for modern societies as global age demographics shift, particularly as the proportion of people over 65 rises to near 17% by 2050. In particular, around 14 million people per year suffer from tendon, ligament and joint-related disorders (aging, rupture, degenerative diseases, etc.) in the USA only. It is not that these orthopedic clinical disorders are relevant to only old people anymore in modern societies where sports people are rapidly increasing. Although real-time monitoring and diagnostic tools that measure various biomechanical signals are thus getting more urgent, current clinical practices (MRI, ultrasound, etc.) and existing implantable sensing systems have limited in continuous monitoring, structural suitability and the extraction of the implantable devices. Nevertheless, thus far, few studies on monitoring such biomechanical signals have been reported because it is inefficient to apply the existing 2D sensor systems to complex structures in the body such as the 1D fibrous structure of a ligament. Furthermore, the need for high sensitivity and wireless read-out remains challenging for implantable strain-sensing systems. I present new research area of implantable one-dimensional mechanical sensing systems which can overcome the practical limitations of existing electronic systems in biomedical engineering.

Keywords: *biomedical engineering, fiber electronics, soft electronics, biosensors*

Biography

Dr. Jaehong Lee is currently a postdoctoral researcher at Institute for Biomedical Engineering in ETH Zurich, Switzerland. He received his Ph.D. degree (2017) in electrical and electronic engineering from Yonsei University in South Korea. He received ETH postdoctoral fellowship and joined Prof. Janos Vörös's Laboratory of Biosensors and Bioelectronics (LBB) at ETH Zurich as a postdoctoral research fellow (2018). His current research interest is one-dimensional implantable electronics.