

Department of Mechanical and Biomedical Engineering

Seminar Series

Soft robotics for prosthetic devices: is it a new paradigm in robotics?

Prof. Gursel ALICI

Professor

School of Mechanical, Materials, Mechatronic and Biomedical Engineering
ARC Center of Excellence for Electromaterials Science (ACES)
University of Wollongong, Australia

Date	June 6, 2018 (Wednesday)
Time	2:30pm
Venue	Room B6619 (MBE Conference Room), Yeung Kin Man Academic Building

Abstract

As a continuously growing field of robotics, soft robotics is the science and engineering of the robots primarily made of soft materials, components and monolithic active structures such that these soft robots can safely interact with and adapt to their environment better than the robots made of hard components. Soft robotics offers unprecedented solutions for applications involving safe interaction with humans and objects, and manipulating and grasping fragile objects, crops and similar agricultural products. The progress in soft robotics will have a significant impact especially on medical applications such as wearable robots, prosthetic devices, assistive devices, and rehabilitation devices. Soft materials with programmable mechanical, electrical and rheological properties, and conformable to additive manufacturing based on 3D printing are essential to realize soft robots.

In this talk, after briefly describing what characteristics differentiate the field of soft robotics from the conventional hard robotics, we will try to answer the question of where we are in soft robotics to establish prosthetic hands with features which will bring them one step closer to their natural counterparts. The primary feature of such a prosthetic hand is to interpret and receive the hand user's intention noninvasively, and equally importantly send sensory feedback about the state of a

prosthetic hand to its user noninvasively in order to help “restore normality” for prosthetic hand users. We will also present the progress we have made in the establishment of a fully 3D printed transradial prosthetic hand at our center of excellence, ACES, at University of Wollongong.

About the Speaker

Gursel Alici received the Ph.D. degree in Robotics from the Department of Engineering Science, Oxford University, Oxford, U.K., in 1994. He is currently a Senior Professor at the University of Wollongong, Wollongong, Australia, where he is the Head of the School of Mechanical, Materials, Mechatronic and Biomedical Engineering since 2011. His research interests are soft robotics, system dynamics and control, robotic drug delivery systems, novel actuation concepts for biomechatronic applications, robotic mechanisms and manipulation systems, soft and smart actuators and sensors, and medical robotics. He has published more than 300 refereed publications and delivered numerous invited seminars and keynote talks on his areas of research.

Dr. Alici was a Technical Editor of the IEEE/ASME Transactions on Mechatronics during 2008–2012. He is a Technical Editor of the IEEE Access, the first IEEE open access journal with interdisciplinary scope. He has served on the international program committee of numerous IEEE/ASME International Conferences on Robotics and Mechatronics. He was the General Chair of the 2013 IEEE/ASME International Conference on Advanced Intelligent Mechatronics held in Wollongong, Australia. He is the leader of Soft Robotics for Prosthetic Devices theme of the ARC Center of Excellence for Electromaterials Science. He received the Outstanding Contributions to Teaching and Learning Award in 2010 and the 2013 Vice-Chancellor’s Interdisciplinary Research Excellence Award from the University of Wollongong. He has held a visiting professorship position at Swiss Federal Institute of Technology, Lausanne (EPFL), City University of Hong Kong, and University of Science and Technology of China (USTC).

Enquiry: 3442 8420

All are Welcome!