

IEEE Control Systems Society
Technical Committee on Healthcare and Medical Systems
Biannual Report

TC Chair: Caterina Scoglio

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Reporting period: December 2015 – May 2016

SUMMARY

In the last 6 months, the TC on Healthcare and Medical systems has continued previously started activities and initiated collecting content to enrich our webpage. New members have joined the TC, and an effort to implement efficient organization of the committee is ongoing. Several special and invited sessions have been organized and proposed to ACC and CDC.

MEMBERSHIP

The number of members has increased in the past 6 months to a total number of 48 members.

CONFERENCES

TC-sponsored activities during the 54rd IEEE CDC 2015 in Osaka

The TC has co-organized with the TC on Systems Biology an invited Session titled “Biological Oscillators” (TuA17) to celebrate 50 years of Goodwin’s Oscillator. Proposers are Alexander Medvedev, Uppsala University Sweden, and Ming Cao, University of Groningen, the Netherlands. The workshop focused on clocks, rhythms, and cycles that are ubiquitous at all levels of a biological system, from a single cell to a multicellular organism. This invited session is aimed at demonstrating the diversity of mathematical techniques that are applied in studies of biological oscillators as well as the broad scope of the ongoing research.

TC-sponsored activities organized for the ACC 2016 in Boston

This TC has organized two invited sessions.

- *Mathematical modeling of diseases and medical intervention effects.* (WeB12)
Organizers: Caterina Scoglio, Kansas State University, and Alexander Medvedev, Uppsala University Sweden. The proposed invited session is aimed at demonstrating the diversity of mathematical techniques that are applied in modeling of diseases as well as the assessment of intervention therapies and strategies.
- *Application of control theory in legged locomotion.* (ThC10) Organizers: Robert D. Gregg, University of Texas at Dallas, and Koushil Sreenath, Carnegie Mellon University.

Co-Endorsed by the TC on Manufacturing Automation & Robotic Control. The goal of this invited session is to bring together leaders in control of legged locomotion, from the controls, dynamics and robotics communities, to foster a single session for exchanging ideas to enable complex experimental systems to exhibit dynamic legged locomotion.

This TC has also organized a special session

- *Role of controls and systems science in health-related research.* Organizers: Caterina Scoglio, Kansas State University, and Fahmida N. Chowdury, National Science Foundation. This session will consist of one introduction, four presentations, and a panel discussion with audience participation. The motivation for the session is that in the recent years, the scope of controls systems science has expanded considerably in the field of health-related research. This session will serve three purposes: (i) introduce the audience to examples of the application of control theory and related tools for health-related research, specifically for treatment and management of diabetes; (ii) present some funding opportunities in this type of multidisciplinary research, and (iii) have an open dialogue about the difficulties of collaborative research between such traditionally disparate fields.

TC-sponsored proposed activities during the IEEE CDC 2016, Las Vegas

This TC has submitted one invited session proposal.

- *Automatic Control of Therapies.* Proposers: Alexander Medvedev, Uppsala University Sweden, Pasquale Palumbo, CNR-Italy, Caterina Scoglio, Kansas State University. This invited session on automatic control of medical procedures has attracted papers that deal with theoretical as well as practical challenges of the field. In particular, papers covering such aspects as therapeutically relevant control performance criteria, suitable controller design principles and system architectures, the safety of automatic control in medicine, implementation of predictive action, parameter and state estimation of biomedical systems for control are accepted contributions of this session.

WEBPAGE

We have plans to add more content to our web page regarding links to books and papers that are relevant in our scientific community. We have started this collection and will continue it.

OTHER ACTIVITIES

A column for the Control Systems Magazine has been published in the February 2016 issue, describing the activities and history of our TC.