Activity Report for the CSS TC on Control of Networked Systems
(Older name: TC on Networks and Communication Systems)

Reported by Asu Ozdaglar, MIT, asuman@mit.edu (TC Chair) and Working Group Chairs: Peter Marbach (Resource Allocation and Network Economics), University of Toronto, Ali Jadbabaie (Optimization and Game Theoretic Methods in Networks), University of Pennsylvania, Venkatesh Saligrama (Networked Sensing and Sensor Networks), Boston University, and Sekhar Tatikonda (Network Control Systems), Yale University.

There has been an increasing volume of research on networks within the CSS community. This research is not confined to work on traditional communication networks, but also extends to a broader set of networks including other technological networks such as transportation and energy networks, social, economic, and financial networks, and biological networks. The increasing interest is reflected in launching of new IEEE journals and new focus fields within flagship journal Operations Research in this area (please see the outlined activities below for more details).

During CDC 2013, there have been many sessions focusing on networks. These include multiple sessions on network analysis, distributed coordination, networked interaction and games, agents and autonomous systems, decentralized dynamics and optimization in networks, and control and optimization for energy systems.

We next outline some additional activities with which TC members are involved and in many cases responsible for organizing.

Paschalidis is the inaugural editor in chief of the new journal *IEEE Transactions on Control of Network Systems* (http://sites.bu.edu/tcns/)

Jadbabaie is the inaugural editor in chief of the new journal *IEEE Transactions on Network Science and Engineering* (a new publication jointly administered by IEEE Computer, Circuits and Systems, and Communications Societies, with support from IEEE CSS and IEEE Signal Processing society. The journal is running and accepts submission in broad areas of network science and engineering. Jadbabaie was also appointed as an associate editor of the new IEEE Transactions on Control of Networked Systems.

Ozdaglar is the area co-editor (together with David Gamarnik) of a new area “Games, Decisions and Networks” within the journal Operations Research. Jadbabaie is an associate editor for this area.

Ozdaglar is one of the editors (together with Eddie Anderson, David Gamarnik, and Anton Kleywegt) of a special issue on “Information and Decisions in Social

and Economic Networks", which will be published in the journal *Operations Research.*

Jadbabaie and Ozdaglar are recipients of a 2012 Multidisciplinary University Research Initiative (MURI) Award for their project "Evolution of Cultural Norms and Dynamics of Socio-Political Change". The project will include collaborations with researchers at Cornell, MIT, Stanford and Georgia Tech. It will draw on network science, game theory, economics and political science to design an analytical framework for analysis and prediction of various socio-political phenomena including political change, social norms, cultural dynamics, and societal transformations.

Jadbabaie is the director of the "Singh Program on Networked & Social Systems at Penn Engineering", which is a new undergraduate program at UPenn that focuses on the study of networked interactions, including the interplay of technology, algorithms, economics, and sociology. (see http://www.nets.upenn.edu/)

Ozdaglar is a co-organizer of the Interdisciplinary Workshop on Information and Decision in Social Networks II, together with Sandy Pentland, Devavrat Shah, and John Tsitsiklis, November 12-13, 2012.

Recent technological and mathematical developments have opened the possibility to considerably improve our understanding of how information flows and decisions are made in large social networks. In this workshop, we bring together researchers from different communities working on information propagation and decision making in social networks to investigate both rigorous models that highlight capabilities and limitations of such networks as well as empirical and simulations studies of how people exchange information, influence each other, make decisions and develop social interactions.

Jadbabaie was elected fellow of IEEE for contributions to the theory of multiagency coordination and control.

Ozdaglar was a plenary speaker at Modeling and OPtimization: Theory and Applications" (MOPTA) conference 2014; Game Theory and Human Behavior Symposium 2013, USC; and SIAM Conference on Control and Its Applications 2013. She was an invited speaker at the W-PIN+NetEcon 2014: The Joint Workshop on Pricing and Incentive in Networks and Systems (in conjunction with ACM SIGMETRICS 2014); Stochastic Networks conference; and Isaac Newton Institute workshop: "Systemic Risk: Models and Mechanisms".

#Jadbabaie was a keynote speaker at the Southern California Workshop on Network Economics and Game Theory at UCLA and at the Network Measurement and Mapping Conference, sponsored by DHS and NSA. He was an invited speaker at the UIUC Summer School on Control of Multi-agent

Systems.

Tatikonda was an invited speaker at the LCCC focus period on Information and Control in Networks, in the workshop held on Oct 17-19, 2012, organized by the Linnaeus excellence center LCCC (www.lccc.lth.se) at Lund University, Sweden. The workshop is the culmination of a five week focus period (Oct 1 - Nov 2) devoted to Information and Control in Networks.

Tatikonda participated in the Workshop on Sequential and Adaptive Information held at McGill in November: http://cim.mcgill.ca/SEQ-IT-13/Seq-IT/

Tatikonda was on the TPC for ISIT 2013, NecSys 2013, and ISIT 2014.

Marbach is a co-organizer of BIRS Banff workshop on "Asymptotics of Large-Scale Interacting Networks," February 24 to March 1, 2013, in Banff, Canada. Ozdaglar is a speaker in this workshop.

The focus of the workshop is interacting networks where agents infer and act on local viewpoints, with global consequences. Of particular interest are scenarios where either the number of agents, or the size of the inference problem, is large and the system behavior can be characterized by an asymptotic analysis. Interacting networks with these properties arise in several contexts such as biological networks, financial and economic networks, social networks, and energy and communication networks. The aim of the workshop is to bring together leading researchers in this area to discuss recent results and open problems and to explore new mathematical techniques and models to study these problems. In addition, the workshop will give some outstanding junior researchers an opportunity to present their own research and become engaged in this field.

Marbach was/is on the TPC for Infocom 2011,2012,2013, for ACM MobiHoc 2012, and ACM Conext 2012.