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Honoree Virtual Keynote No. TBN

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Strategic Information Transmission and Deception

ABSTRACT: *Strategic information transmission* refers to a variation (and a substantial one) of the standard paradigm of information transmission in communication (design of an encoder and a decoder in unison to minimize some distortion measure), where now the encoder and the decoder have (intentionally) misaligned objectives. This leads to a non-cooperative game with a dynamic (non-classical) information structure, where one can adopt as a solution concept either the Nash or the Stackelberg equilibrium. The talk will introduce this class of problems, which have been of interest to multiple communities, including economics, information theory, communication, signal processing, networking, and control, having picked up considerable steam very recently. As an overview of the topic, both old and new results will be presented, with one of the highlights (and perhaps a surprising element) being that there appears to be a major difference between the structures of the solutions under Nash and Stackelberg equilibria, even when the channel is Gaussian and the (misaligned) distortion measures are quadratic. Strategic information transmission is an important underlying feature of *deception games*, which will be highlighted in the talk, along with non-trivial extensions to multi-stage scenarios, covering sensor networks, cyber-physical systems, and multi-agent systems, with adversarial intrusion and elements of deception.

Bio: Tamer Basar was born in Istanbul, Turkey. He received B.S.E.E. from Robert College, Istanbul, in 1969, and M.S., M.Phil, and Ph.D. degrees in engineering and applied science from Yale University, in 1970, 1971 and 1972, respectively. After stints at Harvard University, Marmara Research Institute (Gebze, Turkey), and Boğaziçi University (Istanbul), he joined the University of Illinois Urbana-Champaign (UIUC) in 1981, and remained on faculty there until his retirement at the end of 2020, at which point he became an emeritus faculty. Since January 2021, he has been holding the titles of Swanlund Endowed Chair Emeritus; Center for Advanced Study (CAS) Professor Emeritus of Electrical and Computer Engineering (ECE); and Research Professor, Coordinated Science Laboratory (CSL) and Information Trust Institute (ITI). Since July 1, 2021, he has also been serving as the Executive Director of Illinois at Singapore Pte, Ltd. At UIUC, he has served as Director of CAS (2014-20), Interim Dean of Engineering (2018), and Interim Director of the Beckman Institute for Advanced Science and Technology (2008-10). He spent sabbatical years at Twente University of Technology (the Netherlands, 1978-79), and INRIA (Sophia-Antipolis, France, 1987-88, 1994-95).

Dr. Başar is a member of the US National Academy of Engineering (elected in 2000); Fellow of IEEE (1983), IFAC (2005), and SIAM (2012); past president (2000) of the IEEE Control Systems Society (CSS); founding president (1990-94) of the International Society of Dynamic Games (ISDG); and past president (2010-11) of the American Automatic Control Council (AACC). He has received several awards and recognitions over the years, including the highest awards of IEEE CSS (Bode Lecture Prize, 2004), IFAC (Quazza Medal, 2005), AACC (Bellman Control Heritage Award, 2006), and ISDG (Isaacs Award, 2010); the IEEE Control Systems Technical Field Award (2014); Medal of Science of Turkey (1993); IEEE Millennium Medal (2000); Wilbur Cross Medal from his alma mater Yale (2021); and a number of international honorary doctorates and professorships, with the latest one being an honorary doctorate (2019) from KTH Royal Institute of Technology, Stockholm. He was the Editor-in-Chief of the IFAC Journal Automatica between 2004 and 2014, and is currently editor of several book series.

Tamer Başar has authored or co-authored over 1,000 publications, including six books and several edited volumes and handbooks, in the diverse fields of systems, control, communications, optimization, networks, and dynamic games. His current research interests are in stochastic teams, games, and networks; risk-sensitive estimation and control; mean-field game theory; multi-agent systems and learning; data-driven distributed optimization; epidemics modeling and control over networks; strategic information transmission, spread of disinformation, and deception; security and trust; energy systems; and cyber-physical systems.