



The Institute of Electrical and Electronics Engineers (IEEE)



Galveston Bay Section Meeting

Organized by Communication Society and Joint Societies' Chapters

August 19th, 2019 (MONDAY) Dinner Meeting

**TOPIC: “Towards a Seamless Integration of Drones in Beyond 5G
Wireless Networks”**

SPEAKER: Dr Walid Saad, IEEE ComSoc Distinguished Speaker

PRESENTATION: The use of flying platforms such as unmanned aerial vehicles (UAVs), popularly known as drones, is rapidly growing in a wide range of wireless networking applications. On the one hand, UAVs can be used as aerial base stations to enhance coverage, capacity, reliability, and energy efficiency of wireless networks. On the other hand, UAVs can operate as flying mobile terminals within the cellular networks. Such cellular-connected UAVs can enable a wide range of key applications expanding from real-time video streaming to item delivery. In this talk, we discuss the potential benefits and applications of UAVs in wireless communications. In particular, we present a foundational model for three-dimensional (3D) cellular networks that incorporate both drone base stations and cellular-connected drone users. For this novel 3D model, we study a number of key problems that include network planning and cell association. Then, we focus on the integration of cellular-connected UAVs with ground terrestrial networks. In this area, we present a novel model for wireless-aware UAV path planning that leverage tools from deep machine learning, specifically, from the framework of deep echo state networks. We subsequently turn our attention to the cyber-physical security challenges brought forward by the deployment of drones. In this area, we present a holistic framework, with foundations in behavioral game theory, for addressing fundamental cyber-physical security problems pertaining to drone-based systems. We conclude this talk with an overview on our ongoing research activities that cut across the areas of wireless networks, game theory, machine learning, cyber-physical systems, security, and control.

SPEAKER: **Walid Saad** (S'07, M'10, SM'15, F'19) received his Ph.D. degree from the University of Oslo in 2010. He is currently a Professor at the Department of Electrical and Computer Engineering at Virginia Tech, where he leads the Network science, Wireless, and Security (NEWS) laboratory. His research interests include wireless networks, machine learning, game theory, security, unmanned aerial vehicles, cyber-physical systems, and network science. Dr. Saad is a Fellow of the IEEE and an IEEE Distinguished Lecturer. He is also the recipient of the NSF CAREER award in 2013, the AFOSR summer faculty fellowship in 2014, and the Young Investigator Award from the Office of Naval Research (ONR) in 2015. He was the author/co-author of eight conference best paper awards at WiOpt in 2009, ICIMP in 2010, IEEE WCNC in 2012, IEEE PIMRC in 2015, IEEE SmartGridComm in 2015, EuCNC in 2017, IEEE GLOBECOM in 2018, and IFIP NTMS in 2019. He is the recipient of the 2015 Fred W. Ellersick Prize from the IEEE Communications Society, of the 2017 IEEE ComSoc Best Young Professional in Academia award, and of the 2018 IEEE ComSoc Radio Communications Committee Early Achievement Award. From 2015-2017, Dr. Saad was named the Stephen O. Lane Junior Faculty Fellow at Virginia Tech and, in 2017; he was named College of Engineering Faculty Fellow. He also received the Dean's award for Research Excellence from Virginia Tech in 2019. He currently serves as an editor for the IEEE Transactions on Wireless Communications, IEEE Transactions on Mobile Computing, IEEE Transactions on Cognitive Communications and Networking, and IEEE Transactions on Information Forensics and Security. He is an Editor-at-Large for the IEEE Transactions on Communications.

University of Houston Clear Lake, Delta Building, Room D136

6:30 PM – 8:00 PM - Program and Q&A, 6:30 PM – Complimentary Pizza dinner with reservation

Please RSVP to Dr Zafar Taqvi at Z.Taqvi@IEEE.org before **NOON on Friday August 16th, 2019**

PARKING: IF YOU DO NOT HAVE VALID UHCL PARKING PERMIT, PLEASE INDICATE WHILE REGISTERING. We will provide you with parking details.

Reservations to attend this meeting should be made by email to:
Z.Taqvi@IEEE.ORG

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