STUDENT ORAL PRESENTATIONS II

3:30 PM – 4:00 PM

3:30 PM	**Slot A [Room 1130]**	**Feihu Xu (Photonics)** *"How to Foil a Quantum Hacker"* Quantum cryptography or quantum key distribution (QKD) can provide unconditional (i.e. information-theoretic) security based on the laws of quantum physics. During the past decade, commercial QKD products have appeared in the market; various field-test QKD networks have already been built in the USA, Europe, China, and Japan. However, owing to the imperfections in real-life implementations of QKD, a large gap between its theory and practice remains unfilled. In particular, an eavesdropper may exploit these imperfections and launch quantum hacking not covered by the original security proofs of QKD. Here, I will discuss the quantum hacking activities in the QKD community by using some well-known quantum attacks for illustration. Then, I will present a novel countermeasure scheme, namely measure-device-independent QKD (MDI-QKD), which removes all attacks in the detection system, the most serious loophole of QKD implementations. Finally, I will present our group's recent works on MDI-QKD.
	Slot B [Room 1170]	**Hamed Sadeghi (Communications)** *"An Epipolar Geometry-Based Approach for Vision-Based Indoor Localization Using Smartphone Cameras"* Due to lack of GPS signal coverage in indoor scenarios, indoor localization of users using their mobile phone sensors has been a very hot and challenging field in the last decade. Various signals such as WiFi, infrared, images, etc have been studied for the purpose of user localization. Among all the studied signals, image has demonstrated greater accuracy and stability compared to other signals. In our work, we have proposed an Epipolar-geometry algorithm that provides sub-meter accuracy for user localization (fine localization) while reducing the size of needed database. The proposed method is even able to localize the user at locations not stored in the database, i.e. extrapolates the locations.

3:45 PM	Slot A [Room 1130]	**Mario Badr (Computer Engineering)** *"SynFull: Synthetic Traffic Models Capturing Cache Coherent Behaviour"* Full-system simulation is a long and tedious process; as a result, it limits the range of designs that can be explored in a tractable amount of time. We propose a novel methodology to accelerate NoC simulation. SynFull enables the creation of synthetic traffic models that mimic the full range of cache coherence behaviour and the resulting traffic that is injected into the network. We accurately capture spatial variation in traffic patterns within and across applications. Furthermore, 'burstiness' is captured in our model. These two attributes lead to a model that produces accurate network traffic. We attain an overall accuracy of 10.5% across 3 configurations for all benchmarks relative to full-system simulation. Furthermore, our technique uses the steady-state behaviour of Markov chains to speedup simulation by up to 150 times. SynFull is a powerful and robust tool that will enable faster exploration of a rich design space in NoCs.
	Slot B [Room 1170]	**Amer Samarah (Electronics)** *"Spurious Free Digital PLL"* I present a novel digital solution to avoid the problem of dead-zone behaviour in digital phase locked loop (DPLL) caused by the quantization effect of time-to-digital converter (TDC). The dead-zone behaviour results in chaotic limit cycle behaviour causing higher than expected in-band phase noise and strong spurious tones. This behaviour is dependent on the initial phase difference between the output and reference clock which makes the DPLL performance inconsistent and unpredictable. To alleviate this problem, a noise shaped offset is added to the phase error, in the digital domain to keep the TDC active and away from the dead-zone. The proposed solution is verified by extensive simulation and using a DPLL prototype in a 0.13 um CMOS process.

4:00 PM	**Slot A [Room 1130]**	**Michael Selvanayagam (Electromagnetics)**	*"Passive and Active Methods for Controlling Electromagnetic Fields"*
		Being able to control electromagnetic fields forms the basis for many communication and imaging systems. In this talk we look at how we can control and shape electromagnetic fields using a single surface of electric and magnetic dipole antennas. This will give rise to thin and conformal hardware. We will examine two configurations of these surfaces. An active configuration and a passive configuration. An active configuration involves arrays of electric and magnetic dipoles which are fed to radiate as an antenna array. We will show how such an array can be designed to cloak an object from an incident electromagnetic field. This is achieved by using the antenna array to cancel the field scattered by the object. A passive configuration involves a surface of electric and magnetic dipoles which act instead as scatterers. Here by properly designing the dipoles which make up the surface we can form lens-like devices using a single surface. Here we will demonstrate how a single surface is capable of refracting a wave into an arbitrary direction.	
	Slot B [Room 1170]	**Saber Amini (Electronics)**	*"Beyond Technical: Life Lessons Learned in Grad School"*
		As you go through grad school, you learn more than technical skills. With a dash of humour, this presentation summarizes some valuable advice from current and former grad students that might be useful to you in your future career.	