Nguyen Le Hung – Study Plan

Dear Madam/Sir,

My name is Nguyen Le-Hung, a software engineer in Samsung Vietnam Mobile R&D Center (SVMC). I would like to explain briefly my study plan and research statement to pursue the Combined Master's and Doctorate degree course at Department of Electrical/Electronic and Computer Engineering (DEECE) - University of Ulsan (UOU).

My passion for Electrical Engineering was originated since I was a high school student. I have the strong enthusiasm and curiosity for technologies, especially for the mobile communication devices. Believing that I can contribute to developing the telecommunication equipment in the future, I decided to pursue the Bachelor Degree in University of Technology and Engineering (UET) – Vietnam National University, Hanoi (VNU, H), majoring in Electrical Engineering.

Electrical Engineering is quite a large field which includes many small research trends. Due to personal interest, I chose to attend the courses which can offer me knowledge to build up a solid background of Wireless Communication System. Specifically, I am keen on researching on algorithms, and techniques to process Base-band signal including how to design digital filters in "Digital Signal Processing", modulation techniques, channel coding techniques... in "Digital Communications" , channel estimation techniques to cancel the bad effects of phenomenon which occurs on a wireless channel including: multi paths, fading, scattering, shadowing, Doppler... in "Wireless Communications". These new algorithms and techniques are rapid proposed and applied to help increase the throughput data rate, delay time, as well as improve the reliability for of the wireless channel. I also worked as an intern in "Signals and Systems" laboratory to finish my thesis, namely "Compressive Sampling using Chaos Filter". This research focused on reducing the traditional sampling rate in Analog to Digital Converting step by taking advantages of special kinds of filter: Chaos filters. Chaos system is a non-linear system which has a very unstable structure so that under some specific initial and control conditions, it would behave as random in a few steps. This random-like system can be easily implemented in hardware, as opposed to random sequences. My work focused on re-investigating the performance of compressive sampling by chaos filters. Particularly, I considered the sequences which created by Chua, Lorentz and Rossler dynamical systems by evaluating the successfully reconstruction rate

After graduating, I started working as a software engineer in Samsung Vietnam Mobile R&D Center. My job includes developing the Modem firmware for mobile communication devices (tablets, cellphones…). I am responsible for the RF driver with the duty of developing, debugging, maintaining the modem, RF IC (RF Transceiver) and RF Front-End (Power Amplifier Module, Antenna Switching Modules, external Low Noise Amplifier...) to ensure devices will run at the optimal performance. I have participated in many development projects of Android smart communication devices for South East Asia and Australia/ New Zealand regions. Through these projects, I acquired a great deal of hands-on experiences in programming, debugging for Embedded Modem.

After two years of working in practice and pursuing personal interest in Telecommunication Engineering, I realized that I am in need of developing my understanding of both theoretical and practical issues. Now it is high time for me to work out a plan to pursuit higher education

which I believe would help me bring greater contributions to my organization particularly and the prosperity generally.

Looking for a name from a large pool of various programs, I chose the Combined Master's and Doctorate Degree Course at DEECE - UOU for its quality of education and multinational environment. University of Ulsan is a young university, nevertheless, it is highly ranked not only among Asia universities but also World Universities (top 100 universities in Asia and top 400 university in the World). Recently, Times Higher Education, British higher education evaluation agency, announced that University of Ulsan entered World's top 100 list of universities which were found less of than 50 years ago.

The Combined program offered by Department of Electrical/Electronic and Computer Engineering - University of Ulsan - one of leading Korean higher education institutions would give me the possibility to learn with famous scholars and excellent students, and at the same time, gain precious experience with other perspectives and cultural practices. Moreover, the program is designed with the most updated curriculum which will provide learners the advanced knowledge and techniques in Telecommunication Engineering, namely: "Advanced Data Communication", "Topics on Digital Signal Processing", "Microprocessor Applications" and "Digital System Design"…

I appreciate the chance to broaden my knowledge, meeting and exchanging views with peers from around the world. Besides, being familiar with living and working in a multicultural international surroundings, I am eager to quickly adapt to new environment, to accept and appreciate differences, to learn from others and get connected in a network.

Among the Professors in Electrical Engineering department, I was fascinated by the research topics of Professor Kwon SungOh (sungoh@ulsan.ac.kr) at Communication Network laboratory. I have spent a lot of time reading some of his publications. To the best of my knowledge, a major part of his research focuses on MAC layer of a Communication System. More specifically, his research interest is optimizing algorithms for routing and scheduling in multi-hop wireless network, according to some criteria, such as: Energy-Efficient (Interference Based, SINR based...), shortest path routing or Uplink QoS scheduling… Besides, Professor Kwon's recent works still focus on MAC layer but a partial of them bases on characteristics and properties of Physical Layer L1 like Opportunistic Scheduling in Nakagami-m fading Environments, Uplink QoS Scheduling Algorithm with Delay Estimation for LTE system… In addition, his latest paper proposed a coding scheme based on Error Correction Reed-Muller code for wire-tap channel.

Professor Kwon's research is not completely matching to my previous experience, however, I am always eager to study about optimizing algorithms for routing, scheduling, random access…on MAC layer to complete my picture of wireless communication system. Thanks to the closely relation between two layers of a Communication Systems: Physical layer and MAC layer, I believe that the knowledge and skills that I acquired while researching and working on Physical Layer would somehow be helpful for my future research when I work as a research assistant in Professor Kwon SungOh's laboratory. Besides, continuing to research about the Channel Coding techniques (Reed-Muller code, BCJR, LDPC...) is also a promising choice.

I strongly believe that the overall picture of Wireless Communication system that I will accumulate by finishing the Graduate Courses in the Combination program together with excellent skills that equipped by working as a research assistant in Communication Network laboratory will enable me contribute to developing the very first communication processor for mobile devices in Vietnam .

I well understand the great pressure and challenges that will be presented to me when studying in such a distinguished program, but given a chance, I am determined to overcome any obstacles to attain my destination.

Thank you for your time and consideration

Nguyen Le-Hung