This statement of objectives is intended for use with my application to the Doctor of Philosophy graduate program at the Electrical Engineering and Computer Science Department, Massachusetts Institute of Technology. This document starts by portraying my educational background, of both the Bachelor and Master's degrees. Then, it briefly states my professional experience during the employment as a systems engineer and explains my research experience during the Master's degree study. Then my interest in MIT's teaching and research is elaborated and finally my future plans after Ph.D. graduation are described. After finishing reading this statement of purpose, the committee will learn why I am qualified to be an excellent student of the program, what motivates me to pursue the doctoral degree at MIT and why it is so important for my future profession that I earn this degree.

During my undergraduate study, in addition to a number of Electrical Engineering subjects, I studied a wide range of mathematical subjects including four Calculus courses, a course on Probability, and another on Linear Algebra and Complex Numbers, all of which are basic principles of computer science. Moreover, I passed two courses on computer programming, data structures and algorithms, which are the crucial knowledge of a successful computer scientist. For the Master's degree study, I passed eight credited computer science graduate courses. I received four As from the following courses - Information Systems Architecture, Artificial Intelligence, Distributed Systems, and Advanced Topics on Computer Networks (Multimedia, Wireless and Adhoc Networks). The other four B+ subjects were Computer Algorithms, Theory of Computation, Embedded Systems, and Database Management Systems. Moreover, I studied two non-credit courses - namely Computer Security and Special Topics on Distributed Systems (Service Computing). In sum, I earn a solid foundation in computer science as a result of my undergraduate and graduate study.

I also have seven-year professional experience working at Aeronautical Radio of Thailand or Aerothai, a state enterprise under the Ministry of Transport, Thailand. One of Aerothai's principal missions is to provide air navigation services or air traffic control within Thailand's airspace. Specifically, the department of air traffic data systems engineering is responsible for the provision and administration of data systems that support air traffic controllers' operations efficiently and continuously. At the department, my colleagues and I design, configure, and implement those systems by taking advantage of enterprise-graded information system products, mostly of the USA, such as HP and Dell servers, Oracle and Microsoft databases, Cisco network equipment, and VMWare's virtualization technology, etc. One of the interesting aeronautical applications that runs on these infrastructures is the flight scheduling service, named Bay of Bengal Cooperative Air-Traffic Flow Management System or BOBCAT. BOBCAT manages the air traffic over the Bay of Bengal, which has the security constraints. Approximately 60 flights per day request to fly through this narrow airspace; therefore, International Civil Aviation Organization or ICAO demands that the airspace be managed by Aerothai, after the architectural and algorithmic competition with other organizations. Nowadays, BOBCAT smoothly serves tens of airline customers requesting air space slots over the area every day thanks to Aerothai's effective software systems and responsive operational procedures. Therefore, I have witnessed how these innovative products help transform air traffic data systems into those with enhanced reliability and efficiency. This hand-on experience has provided me with practical aspects of enterprise information systems with the safety-critical applications, and motivates me to study more deeply and broadly in computer science, a core foundation of computer-related products and services.

Up to now, I have published three academic publications, two of which are in international conferences' proceedings and the other is in an ACM journal. First, "Energy-Efficient Gradient Time Synchronization for Wireless Sensor Networks" was published in the proceedings of the Second International Conference on Computational Intelligence, Communication Systems and Networks or CICSyN. In the paper, we designed an extended version of gradient time synchronization protocols that was more time-accurate and energy-efficient, while maintaining a "gradient" property. With the gradient property, geographically adjacent nodes are able to maintain minimal synchronization errors. Second, "Desynchronization with an artificial force field for wireless networks" was published in ACM SIGCOMM's *Computer Communication Review*. The desynchronization problem was analogous to a resource allocation problem in which nodes cooperated to take turns accessing to the same resource. In this paper, we provided a prove of convexity of this problem. Additionally, we designed a desynchronization protocol, inspired by electromagnetic force field, that performed in a distributed manner, better scaled with network sizes and densities and produced less desynchronization errors. The first two papers were my work under the supervision of Assistant

Professor Dr. Chalermek Intanagonwiwat. Third, in 2013, I had a change to work on a research project with Associate Professor Dr. Teerasit Kasetkasem of Kasetsart University. In this project, we used a signal processing technique to track a moving object in a field given binary sensor observations. In this paper, I was fully responsible for the manuscript preparation and partly for experimental simulation. Finally, the paper titled "A Moving Object Tracking Algorithm Using Support Vector Machines in Binary Sensor Networks", was finally published in the proceedings of The 13th International Symposium on Communications and Information Technologies.

I desire to advance my study to a PhD in the US because of the following three main reasons. First and most importantly, I want to be a professional researcher in computer science in the future, either in an academic institution or in a research laboratory and a doctoral degree is an important precursor to the research profession. Second, I agree with Matt Welsh, previously a professor of Computer Science at Harvard University, about a PhD study. He suggests that "You get an intense exposure to every subfield of Computer Science, and have to become the leading world's expert in the area of your dissertation work." For example, during my PhD study, I will have an opportunity to get exposed to a variety of academic subjects and research projects in computer science, such as Artificial Intelligence, Computer Graphics, Robotics, Databases, Systems, Software Engineering, and Computational Science, etc., all of which will considerably expand my intellectual horizons in computer science. Moreover, the PhD study will train me to be an expert in the field of my dissertation through the educational systems and processes, together with my assiduous and persevering efforts. Third, I am conscious that studying at a PhD level requires an academically vibrant environment which includes surroundings with brilliant students and faculty members, as well as accessible academic conferences and seminars. In my opinion, all of these are prevalent in the US educational systems and universities.

I aspire to become a PhD student at Electrical Engineering and Computer Science Department, Massachusetts Institute of Technology, a prestigious university in the US, because I am particularly interested in its teaching and research. To begin with the teaching, Assistant Professor Nate Foster's Network Programming is of my particular interest because network programming is a skill that I need to master in order to be a competent computer network researcher in the future. Network programming has a distinctive style because it entails several modules and components from application layers down to MAC and physical layers. Moreover, it is difficult to debug network programs because of distributed nodes inter-connected by error-prone and latency-inducing communication links. In addition, the "Seminar in Programming Languages" course will provide me with hands-on programming skills that are essential for my researcher career. Furthermore, Associate Professor Emin Gn Sirer's Operating Systems is also an interesting subject that educates students with theoretical and practical aspects of operating systems. Operating systems are indispensable middleware of today's computing systems that reliably and systematically links the application software with the computer hardware. Computer network research often involves modifying or testing low-level abstractions of operating systems; therefore, principles and practice of operating systems will give me a deeper understanding and stronger expertise in computer network research. In addition, "Cornell Systems Lunch" is a seminar that introduces students with novel and recent systems research. I look forward to attending and participating in this seminar because it will teach me to think critically and scientifically during the presentations and discussions. In sum, these four courses taught and driven by the faculty at the Electrical Engineering and Computer Science Department are just a few examples showing my interest in the teaching at MIT.

The following are MIT's faculty whose research projects interest and excite me. First,

Second,

Third,

When I am matriculated as a Ph.D. student at the Electrical Engineering and Computer Science Department, Massachusetts Institute of Technology, I will attend those interesting classes mentioned above along with other required courses. However, I will begin discussing research projects with the professors mentioned above and attending lab meetings as soon as possible as I realize that research is an inseparable and indispensable part of the Ph.D. study. According to my advisor, Assistant Professor Dr. Chalermek Intanagonwiwat, graduate students should not wait for the next semester to begin and then they begin doing research again; they must do it continuously and incessantly until they reach an immediate milestone. I name this concept "zero-day research" and I plan to adopt it to my Ph.D.

study at MIT. In other words, while studying courses, I plan to look for an advisor and a potential research topic so that I can start working on it as soon as possible. In sum, the advisor and topic of my dissertation will be an important starting point of my Ph.D. study path to my graduation.

My plan after graduation with a doctoral degree is that I will look for a research or post-doc position that is related to the field of my dissertation in order to continue to accumulate research knowledge and experience. Therefore, within five years after graduation, I will become a real expert in the field and plan to lead my own research laboratory. Research experience gained during the PhD study and accumulated after graduation will play an important role in attracting funds and students into my lab.

I would like to express my appreciation to the graduate admission committee of Massachusetts Institute of Technology for taking my statement of purpose along with other application materials into consideration. I hope that the committee will be convinced that my educational background, academic and professional experience, and research ambition and motivation are the evidences sufficient to suggest that I will be an excellent student of the PhD program and a competent researcher in computer science.