**Applicant: XX   Program: Communication Engineering (XX University)**

The magnificent Great Hall of People where Chinese People’s Congress (equivalent to parliament in western political system) is based is the building for the country’s top-level political decision-making processes and for the performance of the most prestigious international artists or orchestras like the Jewish violinist Itzhak Perlman or Berlin Philharmonic Orchestra. It was in this very building that a defining moment occurred to me on December 19, 2003 when, at the award ceremony of the XX Electronic Design Contest 2003, my teammates and I, representing the School of Information Engineering of Beijing University of XX, were conferred on the first prize of the contest and the system we designed received the XX nomination, the highest honor of the competition to which only 19 systems out a total of 3000 were eligible.

For me, equally memorable was the contest itself, which led to the prize. For 4 days and 3 nights from Sept. 15 to 18, 3000 teams (each consisting of 3 members) participated in the contest in which each team was assigned a project. Every project must be completed within the time limit and a thesis submitted. As team leader, I organized the work of our team methodically. Continuous thinking and programming made me exhausted but I could not afford to go to sleep for even a minute because any delay might cause the exceeding of the time limit. I managed to stay awake simply by continuously drinking exceedingly strong coffee and I was sustained by the passion for circuit design and the spirit of perseverance and indefatigability. I experienced severe frustrations when a circuit could not be closed up or when a carefully designed circuit refused to work according to my intended effects. But at the end of the contest, through concerted efforts, we turned out a system design characterized by not only powerful functions but also innovative algorithms.

As a matter of fact, this was not the sole contest I participated in. Prior to this, as a sophomore, I took part in the XX Design Contest 2002 and was also the winner of the first prize. Those two contests played a determinant role in my undergraduate career because they charted out the course of my academic pursuit. Frankly, I was somewhat confused as to where my interest lay as a freshman. This resulted in my temporary disorientation which, combined with mal-adaptation to the rigorous curriculum and challenging coursework and with engagement in part-time jobs that diverted much of my time and energy, led to my relatively low GPA for the first year. In taking part in the contests, I found myself fascinated by circuit design and this discovery helped shape my objective—to become an accomplished electrical engineer or a professor in electronics. With the formulation of this objective, I doubled my efforts and my academic record since the second year exhibited steady yet remarkable improvement, achieving top-ranking scores in such core courses as Electrical Circuitry, VHDL, Data Acquisition and Processing, Principles of Communication, Information Theory, Mobile Communication, and Data Structure.  In the experimental course of Digital Circuit Design, I even obtained 99 points, an unprecedented score in the history of our school.

As my academic performance became distinguished, I started to receive a spate of honors and scholarships. I was awarded third-class and second-class scholarships as a sophomore and as a junior. For the two first prizes that I received, I was given extra credits so that my overall GPA so far reaches 84/100, which ranks me among the top 10% in a total of 160 students in my grade.

As an engineering student, the cultivation of practical abilities and problem-solving skills is the most important. In preparing for the two design contests, I was admitted into the newly launched Innovation Laboratory of our school and received intensive trainings under the direction of Prof. XX and I was even appointed as assistant manager of the lab. There, by devoting myself to digital circuit design, I produced designs of a lot of systems including XX, XX, XX, XX, XX and so on. Currently I am leaning to design embedded systems with ARM (Advanced RISC Machine) and busy with courses of Artificial Intelligence and Digital Image Processing because I have been enrolled as a member of the XX Team and will participate in the XX Contest in the coming June.

In addition to improving my hands-on abilities, I have also endeavored to develop my research capability. With a strong interest in the matching between AVR microcontroller and Altera CPLD/FPGA, I invented several effective methods to communicate efficiently between them. My research findings became the foundation for my research paper XX, which has been accepted to be published in the 6th Issue (2004) in XX, first-rate scholarly journal specializing in microcontroller and FPGA.

My research aptitudes have been even further developed in my completion of a book named XX. Within three months immediately after winning the XX Contest, I was invited by the general representative of XX Co. in China to compose a book on the integrated application of microcontroller and CPLD/FPGA. It is a pioneering work since all the existing literature in China is only concerned with the individual treatment of each of them, rarely touching on their combined application. Summarizing my experiences of preparing for the contest, I gave thorough explanation of their application using simple language and more than 100 diagrams designed by means of Visio software. Although the technology involved is not so sophisticated, the book, scheduled to be published in May 2004 by XX University Press, allows learners to grasp the integration of microcontroller and CPLD/FPGA within a short time. Written systematically, the book has permitted me to develop methodical academic thinking and scholarly procedures and given me a strong sense of achievement as an undergraduate. My advisor Prof. XX has made my book a supplementary material for the course Data Acquisition Technology and appointed me the teaching assistant of the course.

Motivated by my interest in FPGA and its application in communication, I am writing my graduation thesis XX. I plan to realize the system through FPGA and microcontroller. This topic is the most difficult among all the graduation projects and in choosing this challenging project, I wish to combine my interest in wireless communication with my skills in circuit design.

Spread Spectrum is the theoretical cornerstone for the 3G mobile communication and personally I believe that Software Radio will play an indispensable role in the 3G wireless communication, especially in the seamless communications across incompatible radio standards. Therefore, I expect to concentrate on spread spectrum communication and software radio. In the current software radio, the central computation unit is generally digital signal processor. However, as DSP programming is usually sequential and cannot be parallelized, its low speed prevents it to process high-frequency signals efficiently. By contrast, FPGA can be parallelized to achieve high performance，leading me to believe in its replace of DSP as the central unit in software radion and the book by Prof. XX from XX, Digital Signal Processing with FPGA, has further reinforced my conviction. In choosing to concentrate on spread spectrum communication and software radio, I wish to keep abreast with the most updated development of mobile communication technology in the world and I believe that, through due efforts, I will make important achievements in those two areas.

As a student member of IEEE’s Circuit and System Society, I often use IEEE explorer to search for the latest papers on communication and circuit. This contact with the world’s most authoritative IEEE has broadened my perspective and spurred me to expose myself to an advanced international education. My sound academic foundation, my capacity for independent research, and strong interest and rich potential are factors that may guarantee my success in my proposed program.

According to Shannon’s Channel-Capacity Theorem, with the signal-to-noise ratio (SNR) remaining constant, greater channel capacity can only be achieved by greater bandwidth. This equally applies to my academic pursuit. I must make greater efforts in order to achieve greater successes. The sleepless 4 days and 3 nights during the XX Contest has made me understand that I have the stamina to conquer any challenge. Therefore I will face my future challenges with full confidence and will derive immense satisfaction in seeing technology serving the needs of human communication.