STATEMENT OF PURPOSE

For many years, I have built up a keen desire in expressing myself through digital art — computer graphics, animation and music — whose capability and expressibility fascinated me and satisfied my aspiration to create. I have designed numerous websites and graphic layouts, taught myself 3D computer graphics (3DCG), and played with midi keyboards and audio editing softwares. As I graduated from one task to another, I realized that, although computers are powerful tools for rendering complicated effects and art styles through simulation, it remains difficult for artists to translate their intentions into languages which computers recognize. Thus, I intend to pursue a graduate degree in computer science to narrow the gap between technology and digital artists so that they can effectively unleash full power of computation on artistic purposes.

Passion for digital art, especially 3DCG, has motivated me to take advanced courses in image synthesis, image processing, digital visual effects, computational photography and real-time rendering. I led many course projects designing systems for art production ranging from a particle effect generator to a musical chord arranger. Notably, friends and I took months to survey and write a ray tracer accelerated with streaming SIMD extension in our sophomore year. It was my first encounter to what is inside the blackbox of 3DCG, and the excitement was unforgettable. These collaborative software projects provided me in-depth understanding of the technical basis of many art tools I once used. Such hands-on experience with digital art uniquely qualifies me for the Computer Science MS Program in "Real-World Computing".

I am most proud of my contribution to the development of "Lighting-By-Guide System". As an undergraduate student of Communications and Multimedia Lab, I was granted complete control of the project under supervision of Professor Yung-Yu Chuang in 2011, since when I have fostered essential traits for an independent researcher in computer graphics. I learned to discover bottlenecks through benchmarking and examining intermediate products, ask crucial questions which lead to significant improvements, and widely consult resources from journals to manuals. I managed the project through all engineering phases in the development of the "Lighting-By-Guide" algorithm to predict the quantity, positions, and properties of lights in a 3D scene from an artistic depiction of the anticipated render, namely the lighting-guide. The system largely reduces workloads of lighting artists by offering them lighting configurations that closely resmemble concept illustrations. My proposed "most-noticeable-light-first" optimization target succesfully achieves fast convergence and low perceptual difference between lighting-guides and images rendered with the predicted sets of lights.

My proficiency in researching stemed from not only abundant engineering experiences, but the concrete scientific trainings I recieved. Since 2008, I double-majored in chemistry and computer science. As a natural science, the study of chemistry places great emphasis in think-

ing critically and accurately, which complements my training in engineering that lays stress on innovation and systematic analysis. I was invited to join Theoretical Chemsitry Lab led by Professor Yuan-Chung Cheng. We verified novel designs of nonlinear electronic spectroscopy by simulating quantum dynamics of molecules interacting with laser pulses. Through formulating and implementing physically accurate models on computers, I acquired first-hand experiences working with various numerical algorithms and visualization packages. Moreover, the environment has cultivated my down-to-earth attitude toward solving issues whose wherefores are not understood. To me, revealing causes and effects of phenomena is far more urgent than getting codes to run. These skill sets and cogitation of a scientist are transferable and has contributed much to my success with the "Lighting-By-Guide" project.

My ultimate goal is to leverage both my scientific and engineering background as well as my strong desire in creating digital artworks to establish an animation studio in my homeland, Taiwan, producing movies and developing intuitive tool sets for digital animators. However, since currently existed production pipelines for animated films are designed mainly for highly commercialized studios, they hardly suit the need for individual animators and the low capital-intensive environment in Taiwan. A solution is to revolutionize the ways artists can convey their intentions to computers so that detailed division of labor becomes unnecessary. While mere passion is not enough to grant the fulfillment of this goal, I need to recieve further trainings in doing research and to master the field of computer graphics.

The "Real-World Computing" specialization of the Computer Science MS Program at Stanford, with full access to graphic courses as well as sister disciplines, offers the challenges and oppurtunities I seek. This include the opportunity to work with faculties such as Professor Ron Fedkiw of the level-set method in graphical simulations, Professor Vladlen Koltun whose work greatly simplified 3D content creation, and Professor Pat Hanrahan whose contribution to rendering subsurface scattering effects sets the industrial standard. The challenge of working alongside the best and brightest student body will also be invaluable. One of my undergraduage projects, "Milktea Rendering", was inspired by several amazing works from the rendering competitions of the course "Image Synthesis Techniques" in 2008 and 2009. Hence, I full-heartedly anticipate in studying computer science at Stanford. With the guidance from your faculty, my diverse experiences and dedication to excel, I am confidnet in extending the frontiers of computer graphics as well as commencing my career as an industrial researcher in computer animation with a promising start.