

Curran Kelleher
Personal Statement

I am incredibly fortunate to have been able to live life with the tremendous opportunities I've had. In high school I experienced a transition from being a below average student with no interest in school to an enthusiastic scholar. The transition came about when I had the realization that all of human knowledge and experience is interlinked, and ultimately useful in understanding the universe and living life to the fullest. From that point forward I was committed to a life of engaged learning, no matter the circumstance or conditions. I now intend to use my faculties and existence to better humanity as best I can, living from this mode of engaged learning.

When I was thirteen I took up the guitar, which became my greatest endeavor until I finished high school. Playing in groups of musicians outside of a school environment taught me what it really was to be a musician, which is as much a social skill as anything else. The most fundamental skill I gained from the musical experience was that of social integration. As a musician one must effectively integrate oneself into the ongoing processes within which one finds oneself suddenly embedded, otherwise perish as a musician. As I learned later, this kind of scenario is not unique to music, but is universal to human endeavors.

Late in my high school career I was simultaneously introduced to biology and computer science. For both I developed immense curiosity and enthusiasm for learning. Through my high school biology teacher, I was able to arrange a volunteer position at a research lab at UMass Medical Center where I worked with international doctoral students on research projects in fruit flies. This was my first encounter with academia. I found this world to be completely different from high school, so intense and full of deep knowledge. I got such a kick out of making those poor Ph. D. students sit for hours and explain embryonic axis specification to me!

My interest in biology and computer science remained, and all my music mentors recommended I pursue one or the other rather than music, as music is a very tough profession to maintain. I had also developed an interest in physics and its relation to biology. I began to search for college programs that had an emphasis on all three domains and discovered the concept of bioinformatics. The same kind of intensity, depth of knowledge and altruistic intent I had been so enamored by in the biology lab where I had volunteered seemed to be present also in this area called "bioinformatics" too, so I decided to pursue it.

During my college search I attended an open house at the University of Massachusetts at Lowell where I met Professor Georges Grinstein. At that time I had no way of knowing the tremendous positive influence this man would have on my life. After the other open house visitors had left, I remained engaged in conversation with Professor Grinstein. At the end of this visit he offered me a summer position in his research lab the Institute for Visualization and Perception Research (IVPR) which I took with enthusiasm, finalizing my decision to attend UMass Lowell.

When I entered UMass Lowell as a freshman, I was focused on investigating what little overlap I could see at that time between biology and computer science: fractals and complex systems. I had been doing lots of independent reading on such subjects when I discovered a one week course being offered at MIT entitled "Complex Physical, Biological and Social Systems". I managed to persuade my parents to send me to this course as a Christmas gift, which turned out to be well worth the lack of presents that year!

I attended the one week course, taught by Yaneer BarYam, and learned a tremendous amount about the dynamics of complex systems and related conceptual tools. I got to know Professor BarYam, and he invited me to volunteer in his research group the New England Complex Systems Institute (NECSI). I visited NECSI and was instantly attracted to the atmosphere of big ideas and endless possibilities. Every Friday for rest of my freshman year I took the train to Boston and met with a small team of researchers to work on the problem of creating a simulation of the world's large scale socioeconomic dynamics.

During my sophomore year, an opportunity came up to spend a year abroad in Germany. Through the UMass Hessen exchange program I was able to attend German language and Computer Science courses at the Technical University of Darmstadt for my entire junior year. Through a contact of Professor Grinstein, I was also able to work in a research center there on a domain entirely new to me computer vision, 3D reconstruction and massively parallel processing. That year was my first experience of immersion in an alien world. I saw for the first time that the world is much larger and more complex than I had thought. As I grew more at home in Germany, I realized I am destined to become a globally engaged citizen whose work is international in scope. One of the most important things I learned from the year abroad is that I can adapt to anywhere I go, and that I can relate to anyone on earth by virtue of the fact that we are all human.

I remained in the IVPR group throughout my undergraduate career, where I participated in many diverse projects. This involvement had afforded me many great opportunities and prepared me well for being a researcher. I eventually decided I want to remain in research and eventually become a professor. I accepted an offer proposed by Professor Grinstein to enter the Ph. D. program at UMass Lowell and have as coadvisor Daniel Keim at the University of Konstanz. I plan to spend a significant portion of my Ph. D. time at the University of Konstanz in Germany.

After I graduated from UMass Lowell, I spent the summer at University of Konstanz working in Daniel Keim's research group. This was an incredible experience. I lived in a student dorm on the Rhine river and rode my bicycle to the university every day. I found the atmosphere of the university and research group very positive and stimulating. I worked on the development of my own proposed research plan, the Universal Data Cube (UDC), for the entirety of my stay. This visit to Germany confirmed once more for me that my professional career will definitely be global in scope, and will be oriented to benefit all of humankind. I am fascinated by my current research area because it enables me to pursue these overall career goals in an effective manner.

I plan to pursue the development of the Universal Data Cube, as well as higher levels of a visual analytics and visual knowledge management platform built upon it. My primary activities for the duration of my Ph. D. studies will be limited to the scope of funded projects. This fact will likely curb my ability to pursue my own research goals to completion. I have access to all the resources I need to complete my goals, but I am not certain what demands future funding will place on how I spend my time. With the aid of this fellowship, I can be secure in knowing I will have sufficient time in the coming years to dedicate to fulfilling the goals outlined in this proposal. The fellowship would allow me to actually complete the largest, highest impact project of my academic career to date, which would put me in a position to execute a prolific professional career in research.

Additional material for consideration is available at www.curransoft.com/grfp .