

## Personal Statement

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### **Long term agenda**

My personal long term agenda is to address social issues. This may seem a strange goal for an engineering faculty, but its intimately intertwined with what I do: teaching, inspiring students, inventing technology, and thinking. Let me quote from the research statement written at the time I applied to UCSC.

My driving belief is that technology as a whole should be used in the service of humanity. Applied properly it will enhance health, education, safety, justice, and economic equality. Many of these emerging social technologies will rely heavily on visual communication and computed imagery. This imagery must be sufficiently complex and rich that it allows for deep understanding, analysis, and communication.

[...]

In the long term I would like to establish a center for social technology, bringing together researchers from a broad range of fields. This center would explicitly identify future applications of technology in the service of humanity. Further it would encourage the research directions and collaborations necessary to enable those applications. Remote surgery on a patient halfway around the world, digital archival and preservation of priceless art, virtual communities for the isolated, and education in third world villages are all examples of realizable goals.

*This* is what gets me up in the morning. How is this related to what the university is paying me to do you might wonder? I believe the best way to have the kind of impact I want to have on the world is to: build a successful research program inventing new technologies, inspire legions of students to educate themselves, and to create a personal reputation of sufficient standing that when I talk, people will listen. In short, if I am to succeed in my personal goals, I *must* succeed in the day-to-day job of being a professor.

As examples of ways that my research and reputation allow me to achieve these goals: I advise VSee Lab, a startup selling visual communication tools which work when no other communication channel is feasible. These tools have been used by hospitals in Afghanistan, the UN Food program in Indonesia, and aid workers in Africa. I was recently approached to consult for one startup that sells 3D sensing technology for automobile collision avoidance systems and another that is creating a tiny ingestible camera that will replace colonoscopies with a less intrusive procedure and thus reduce cancer deaths.

I realize that the university may be more interested in my shorter term accomplishments and goals. As I see things, my job description consists of three major categories: research and publishing, teaching and advising, and seeking funding in order to support the first two. In the sections below, I've outlined my activities in these areas.

### **Research and publishing**

During the time since applying for a position at UCSC, I have co-authored 17 research papers. Two of these papers were presented at SIGGRAPH, the most prestigious publication venue in computer graphics, and 6 of the papers were presented at the premiere computer vision conferences, ICCV and CVPR. Another 2 were revised conference papers published in the best machine vision journal, PAMI. The remaining papers were published in a combination of other conferences and journals, including robotics or machine learning venues chosen by my collaborators working in those fields. This work is

sufficiently respected that I am regularly asked to be on the program committee of the very best graphics and vision conferences, a service that I agree to about once a year.

I think it is important to note that much of this work was collaborative with colleagues and students at other institutions. I find that I work best when I collaborate widely. In nearly all cases, I acted as an advisor, and therefore the students rather than I should be credited with actually accomplishing the work.

My research efforts were focused primarily on the computational portions of sensing systems which interpret or record aspects of the real world. Stated briefly, the contributions of these papers include: higher accuracy laser scanning and shape estimation under a wider variety of conditions than was previous possible, a method for removing blur due to camera shake in hand held long exposure photographs, robust methods of estimating the motion of people, a model of the shape of humans parameterized by both pose and personal identity, and applications of shape acquisition to robotic map building.

### **Teaching and advising**

How might I pursue my personal goal to see technology being applied to more social issues? I could form perhaps one or two startup companies myself, or I could inspire a generation of students to go change the world for me. The latter strategy provides better leverage. As a result, I take my teaching seriously. I am at a university precisely so that I can shape young minds. It is important not just as part of my job description, its important to my overall goals.

One indication of this commitment is receiving a UCSC Excellence in Teaching Award Honorable Mention in 2006 (given to approximately 2% of faculty).

I also received an Omidyar Network Community Favorites Award in 2007 for a new course I designed. This latter award was given in recognition of innovative teaching style, in particular, involving a wider online community in the discussion forums related to the class topic of Technology Targeted at Social Issues. The award was a pleasant surprise to me, and included a \$5000 gift to the university to support my teaching.

Of course I am advising the usual array of students in independent research, including a current set of 3 PhD students and 3 MS students. I have graduated an additional 2 MS students and 6 undergrads who were pursuing research in my lab. These students have gone on to graduate programs at UC San Diego and University of Washington, formed their own start-ups, and work for companies such as Dreamworks/PDI, Apple, and Logitech.

### **Seeking funding**

I have raised approximately \$300,000 from industrial sources, plus perhaps another \$50,000 in equipment donations. I have found that these sponsors also contribute intellectually, making their contribution greater than the actual dollar amount. Another roughly \$100,000 has come from internal UC sources, usually on shared awards with other faculty. In order to make better multi-year funding plans I would like to obtain larger federal grants. Unfortunately I have not yet been successful. I have applied for 3 large grants independently and 2 in collaboration with other faculty, totaling approximately \$4 million.

This year I was invited to participate on an NSF panel for grants in my research area. I found the experience educational and I imagine that my future attempts at obtaining NSF funding will be improved.

In order to better understand the process and politics involved in obtaining large grants I have helped several other organizations prepare (successful) grants. These include \$900,000 of SBIR/STTR funds split between university and corporate partners and \$1.5M of venture funding to a start-up partner. In addition to being educational to me, there is a good intangible return since for instance, my university partner is using some of these funds paying a student who is pursuing my research ideas.