**ESTVI 13 Panel discussion:**

Seth Teller: Why don’t we begin by discussing funding and how to promote funding of research in the area of ESTVI.

Peter Hallinan: How to pitch an idea that is too risky for standard VC, such as ESTVI? ESTVI devices should eventually pay for themselves thru increased productivity and increased effectiveness on the job, earning money.

Serge Belongie: Worked for years with volunteer student teams on AT projects. Wasn’t able to get these projects funded. Was able to get computer vision components funded, though. What he wants: if he can get a large proposal on a computer vision topic (e.g., Google Glass), is there a way to get a supplement (e.g., REU with NSF to get a student) for AT?

Zhigang Zhu: Had an NSF grant, multi-disciplinary REM supplement (a pilot program, may not exist next year). Engineering frontier through innovation grant.

Roberto Manduchi: It’s hard to do AT well, especially as engineers. Hard to educate students on AT, and he is still learning how to run experiments. It’s also hard to motivate students to do AT. If they do computer vision, they’re likely to get attractive job offers in Silicon Valley. Before asking about money, let’s think about how to do AT research. One goal of ESTVI: to form a community, so we can learn from one another.

John Brabyn: Heartened that people are talking a lot today about UI and human factors, not just engineering. Great to see collaborations with consumers, rehab practitioners, etc. Another change over the years: originally there was a limited set of engineering tools one could apply to environmental sensing; now there are lots more! It challenges us to look at problems not from a tech-driven perspective but a user-driven one: what are the problems a blind or vis. imp. person has, what information do they need, and how to best present it to user?

Sandy Rosen: Not an engineer! Background in PT and O&M. I am problem-focused, not tech-focused. Glad to hear discussion of sensory-motor tasks today – these are so important. To get research ideas, don’t forget to talk to O&Ms! Lots of experience with many different people who have non-vision problems that interact with their vision problems. Think about recruiting O&Ms, kinesiotherapy students. Think about folks who are not just blind – e.g., congenitally blind (vs. adventitiously), who may have other medical issues, who need the most help.

Jeff Bigham: Usually we speak in terms of a design perspective: “let’s find solutions to problems”. But what lots of us do: we see there are lots of problems and lots of technologies, and we find ways to match a problem with appropriate technology. ESTVI people can talk to people on both sides, and find these matches.
German Flores: As a student, I think one thing that’s lacking is getting firsthand experience in the field. Meeting people with disabilities can inspire you to work on this area. Maybe more people from blind/visually impaired community could come to schools more.

Gary Kelly: I differ with Peter’s point: I don’t think the user population should pay for the technology they need. This approach has failed in the past. 70% unemployment among blind, underemployment is even worse. Most people who will be blind are age 55 or more – how are they going to be employed when they are going to retire soon? I think we need to find other ways to find financing, e.g., involving industry, philanthropy, venture capital (e.g., LookTel funding).

Don Fletcher: To respond to the over-55 comment: my practice is mostly geriatric with low vision. My patients have lots of time to read, they aren’t necessarily working. Mobility is less important because they often stay home. Geriatric technophobia was a huge problem in the 1980s, but this problem is going away – my 101-year old patient loves an iPad and Kindle, and this is common. Portable video magnifier ($290) is very popular for people with worse vision. These new technologies are more effective than optics for many of my patients, and they aren’t too expensive.

Sandy Rosen: I would like to pose a challenge to the room: The population is changing; many more folks have vision loss from brain injury, CVI (showing up in kids). Who would like to take on this research on how these problems affect visual function?

Greg Goodrich: I don’t quite agree with Don’s comment about older seniors having reduced activity level and mobility needs. Around 2003 we started seeing a lot of young veterans (in their 20s) with vision problems from TBI. Before then we had focused on veterans from WW II, Korea, Vietnam, so the population was in their 70s. We didn’t understand the needs of people in their 20s. There was suddenly a big divide between old guys vs. young guys. “I don’t want to go bowling, I want more active recreational opportunities!” Over time, this divide diminished, and old people got more active.

Don Fletcher: Fair enough!

Greg Goodrich: Working with James Weiland (USC) on a mobility aid, we have been asking veterans what they want mobility aid to do. To my surprise, many want a device to recognize faces and people. E.g., a young mother with memory and vision issues would take her kids to a ball field, meet other parents, and not remember who they were – this is socially awkward. Another population we need to understand: TBI (not just troops from Iraq, this also includes stroke victims, car accident survivors).

Sandy Rosen: Cerebral, not cortical, vision impairment.
Andrew Ziegler: Crowdsourcing could create employment opportunities. Maybe a deaf person could trade tasks with a blind person in an appropriate marketplace.

Jeff Bigham: It’s happening on Mechanical Turk!

Seth Teller: One of my students with low vision complains about not recognizing people. His Ph.D. thesis is about a device to help log images, voice, etc. after a social interaction with a person, so that the next time this person is encountered the system recognizes him/her. Everyone I tell about this project says “I want this too!” Some people have this gift (politicians, like Kennedy, who remembered me by name 5 years after he met me once), but most of us don’t. One perspective: these technologies are democratizing, and allow you can be as good as Kennedy at remembering people! Like that little bird in Chieko Asakawa’s talk.

Sandy Rosen: Face recognition is really important. Prosopagnosia affects 2% of population, and it’s really hard to live with! With this condition, you can’t just go up to people and say “Hi, how are the kids?” 2% is a big population, and so many people would face recognition.

John Brabyn: Another challenge I would like to pose: Nowadays we want to turn everything into a smartphone app. This is wonderful, but I am wondering if it’s worth thinking harder about other new technologies, such as 3D printing, which allows for cheap, custom-made devices that would have been much more expensive in the past – and which might allow for a more sustainable business model than selling a 99 cent iPhone app. It would also overcome many of the limitations of smartphone apps. So, let’s think broadly about other platforms and form factors.

Seth Teller: Another comment: many examples of mass commodification lead to a technology that we all enjoy. E.g., if you are walking and can’t see well, you want to know if there are stairs you are about to trip on; you want a device to warn you that doesn’t take up one hand. Today’s smartphones might be able to do this (IMUs, computer vision, eye tracking, etc.) but they lack good depth sensing, such as what Kinect offers. But if you could put Kinect on a smartphone you could have a great solution, which would also be used by sighted people to avoid tripping while walking and texting! What other kinds of killer apps for the non-Visually impaired population could drive these technologies?

Andrew Ziegler: I was working at Qualcomm, where I learned about technology like pico projectors. These will show up on smartphones, so I can watch a video on the wall rather than on the tiny smartphone screen. If you just convince manufacturers to do this right (have the projector and camera be on opposite sides), this is great for implementing structured light and recovering reliable depth maps. HTC 3D Evo had stereo cameras, which could allow stereo depth processing. Some people are making app-spec circuits to implement computationally
intensive algorithms useful for computer vision, such as belief propagation, so that they can run in real time.

Peter Hallinan: I want to provoke more dissent! Unfortunate economic fact: the population is aging. How is the ratio changing between the number who need care vs. the number who can provide care? In 1960, there were more caregivers than those who needed care (one person needing care to 10 who can provide care). By 1975, ratio was already worse. We will be shifting a lot of resources into healthcare. There won’t be lots of extra healthcare money to go around! We need people to be productive longer because we can’t support them longer. I would like to see more people do ESTVI research, but it is vitally important!

Christopher Tyler: I want to disagree! As the population ages, older people maintain their health for longer. So you get the same proportion.

Peter Hallinan: As people age, you get multiple health problems. This increases the burden on people who are younger, healthier.