Susan Atlas Transcription

Interviewed by E.Bobrick

Transcribed by E.Ramirez

SA: My name is Susan Atlas and I am a research associate professor in the department of physics and astronomy and I am also the director of the center of advanced research computing which is where we are speaking today.

EB: So what exactly is the center of advanced research and computing?

SA: So the center of advanced research and computing principal mission is to support faculty lead computer based research and it is advanced in the sense we do supercomputing. We are the super computer center for the University of New Mexico. So we support faculty throughout the university meaning that is not just faculty on main campus but also faculty at the school of medicine. It is also affiliated with institutions such as the mind research institute. Our main focus is on science and engineering computing but in recent the years we have gotten a lot of interest from faculty work in arts and technology like Andrea Polli; and also in the humanities.

EB: It seems to become a very interdisciplinary space or place to work. What would you say is CARC's mission and ultimate purpose?

SA: Well the goal is to enable research projects by the faculty and of course we have many students doing graduate degrees but we also have undergraduates. We have even mentored high school students. So the idea is to apply the resources for faculty and students and technical staff to do the research that they funded to under grants or other mechanisms. Also we do support some teaching as well but the main focus is on advanced computing. So these are not things you can do on a desktop, these are powerful parallel supercomputers. Some of them are GPU based. Some of them have very advanced features with very large shared memory and so forth.

EB: How are the arts specifically are important here? Do they show you something about the computers that scientific research or do they use the computers in ways that scientific research or mathmatical does not? Are they important on their own?

SA: Those are all great questions. I think that the arts have a lot to offer to the traditional areas of supercomputing research which have really been focused on science and engineering, or the so called hard sciences. More recently we have had a research by the faculty in bio medicine. And in all of the areas I think that having a sense of the arts in the respect of natural philosophy in the very old style sense. That everything is not so sylo'd in terms of how students got skills and how students went about their research. I think that having arts technology in the building and having the opportunity for students in the hard sciences… INTERUPTED-We repeated the question a second time

==So at the center for advanced research and computing we regard the arts as very complimentary and very important in cross fertilizing approaches of visualization== and even thinking about scientific and

engineering problems. And problems that would be more of the traditional domains of a center like this, meaning supercomputing. So it has been wonderful to see the growth and the number of students in the faculty who are involved in the arts and the humanities and more specifically arts technology in recent years. We have a very close relationship with the arts technology lab which is next door and co located with CARC. And we have established the CARC art gallery in the building where we show work that has been done by graduate students and researchers who have done arts technology. So we are quite excited about that interaction. Scientific visualization has had a long and interesting history and has been traditionally very closely coupled to large scale computation. Because when you have large amounts of data as you do in Andrea Polli's project and also many of the projects that we do here at the center. It is very important to, as we say "grock" that data by putting it into a visual format because otherwise you really can't comprehend the patterns that are there. So visual arts and digital media are extremely important and an integral part of everything we do at the center.

EB: So just to segway into more specific about Eoculous. The project Andrea is working on right now. How does that fit at what goes on here? How does it strike you specifically technological and harnessing data sets?

SA: We have been very excited to have the Eoculous project here at the center. First of all it is visually very striking so when people come here to the center that is practically the first thing that they see basically because it is so tall and distinctive. It was amazing to see how quickly it got put up and actually I think it came up overnight and everyone was thinking okay what's that? And it was really cool and it's nice to have for not only what it is doing and trying to accomplish. Which is the representation in an online way of data that is not typically visualized and looked at by scientists and engineers; where the project itself is trying to bring forward an understanding of data in real time? But also it is very nice because it puts the visualization of data squarely in the face of anyone who walks into our front door. And again as I indicated a few minutes ago many students and researchers typically leave visualization almost as an afterthought and it really is an integral part of supercomputing and how you understand your data. So what Andrea is trying to do with this project is to do a knowledge representation in real time and provoke thought about it is an artist. But also it represents exactly the type of visualization we have to do in our work on a day to day basis. So I think it is very exciting to have it here and thought provoking and I think it is very inspirational.

EB: It seems that we have come full circle so if we could go back to interdisciplinary practices; was there anything more you wanted to say about that? I remember you wanted to say something.

SA: I do want to mention that we are having an opening on September 1st for the Eoculus project before it goes to its' final home in Utah, we are going to be very sorry to lose it actually. And concurrent with that opening, we are going to the award of a contract to purchase large scale storage for the center for advanced research computing that is a part of the Xena project which is bringing in a graphical processing unit based supercomputer. Which is what we are naming Xena after the warrior princess? And that supercomputer has a part of it, this storage system place that is necessary for all the data that is generated by the simulations and computations that we do and so that opening and event is going to be called Knowledge, Discovery and Representation. And that really links together these two ideas of

the art that Andrea is doing with this piece and the nature of scientific discovery which needs to take advantage of advanced visualization in order to find the patterns that are hidden in very large scale data.

2ND ANGLE-Questions 2nd time

EB: So would you like to start with Xena and you can talk about anything you didn't get a chance to.

SA: The Eoculus project ties in nicely with a new project that we have here at CARC which is the Xena project. And we have recently been awarded a National Science Foundation Major Research Instrumentation grant and these are actually quite competitive. And that grant is supporting the purchase of a GPU or graphical processing unit based supercomputer with associated large scale storage system and that machine shall be arriving in the next month or two. We are very excited about it and it is going to accelerate our science and research codes very significantly. But what is really cool about it is because it is GPU based. It is taking advantage of the same kinds of chips that are used in computers for gaming for example. And also in Xbox's and so forth and these, actually Nividia cards are going to enable us to accelerate our research in some cases as much as 50 to 100 times. So we are extremely excited about that and concurrent with the event we are having with the Eoculous project before it goes to Utah. We are also announcing the first component of the Xena system which is the large scale storage system with about 250 TB and it's expandable to 5 peda-bytes; so quite a bit of storage there. And it is really going to increase the abilities of our center and the supercomputer itself and the storage system by an order of magnitude along with some other machines that will be coming in over a month or two. So we are quite excited about all of that.

EB: And taking a step back can we talk about CARC and more basically the mission statement of CARC; what it is and what it is trying to do?

SA: The mission of the center for advanced research and computing is to support faculty lead computer based research particularly in interdisciplinary areas. So we like to have students and projects that are science, engineering, bio medicine are some of the more traditional areas. But in recent years we have had faculty approach us with art based projects that take for example visualization capabilities at the center. We have a 3d visualization system that was recently given to us by the state of New Mexico. We also have teleconferencing capabilities for collaboration between research groups around the country and in fact around the world. And we take the mission of supporting interdisciplinary work very seriously. So we have quite a bit of space in this building as you have seen. And that is why we are able to accommodate Andrea's project in fact. We have such high ceilings and we really encourage faculty and students to have desks here and offices here so people can rub shoulders and possibly find areas of collaboration or interaction that they really would not have any other way of meeting these people or interacting with these people. UNM is a very large campus and very spread out and sometimes people can take departmental boundaries a little too seriously. So the purpose of a center like CARC is to break down those barriers of collaboration and enhance the communication about different technologies and capabilities and different areas of interest. We have actually helped spawn some interesting collaborations leading two full grant proposals that got funded and really completely new projects. And

really those create very exciting opportunities for the next generation of students. Since 21 century research is really about collaboration and interdisciplinary interactions.

EB: One other thing that we may have not touched on, or on this angle. Specifically about Eoculous, you have some great things to say and as a question: How does Eoculous fit into the mission statement of CARC?

SA: The goal of the Eoculous project is to take data and visualize it and do so in real time. And be thought provoking in the sense presenting data that people might not necessarily be aware of. And kind of, this is what I really like about it; put it in people's faces. Take things they really wouldn't necessarily think about and make it a very large scale, large format and very present. In a sense that is really what large scale visualization is supposed to do for the sciences and for researchers. The goal is to take data that is on a piece of paper or stored digitally in a computer and in which the mind of the scientist or the engineer or the researcher is not in certain ways present to them. It hasn't made been made entirely real to them because they haven't had a chance yet to look at it in a way that makes the ideas that are buried in that data or the patterns that are potentially buried in that data real to them. So I see a really deep analogy between what Andrea is doing in the Eoculous project and what we are trying to do generally in terms of understanding the data that we produce on our supercomputers and that we need to analyze on our supercomputers. The event that we are having on September 1st to formally announce and in fact say farewell to the Eoculous installation since it is going to its final home in Utah. That event is actually going to be combined with the storage component of the Xena project and the Xena system. The event is called the Knowledge, Representation and Discovery and that is precisely recognizing the analogy I just made. The representation part primarily in the form of Andrea's project and the Discovering part in the art of data mining and data recognition and just analyze of data that is on our supercomputers. So we thought that was very nice synergy for what we do already at the center and in particularly the Xena project and what Andrea is doing with the Eoculous project.