Report on Project Grant

Travel Support for Key Volunteers from Southern Africa

Steve Cunningham and Mike McGrath

The ACM SIGGRAPH Project Grants program provided $5000 in funds to help four persons from southern Africa attend the SIGGRAPH 2001 conference. These persons had received Educators Conference Grants from the ACM SIGGRAPH Education Committee and the funds were to help support their travel costs. These persons were

- Sampson D. Asare, University of Botswana, asaresd@mopipi.ub.bw
- Dr. P.M. Mashwama, University of Swaziland, petros@science.uniswa.sz
- Neo W. J. Matome, Centre for Continuing Education, University of Botswana, matomenw@mopipi.ub.bw
- Laurette Pretorius, University of South Africa (UNISA), pretol@unisa.ac.za

These four persons participated in the conference in various ways, attending courses and papers, panels and other programs. They were involved in several meetings, both formal and informal, as illustrated by the following photos:

Petros, Neo, Sampson, and Laurette with Alan

Group planning details of the Afrigraph conference in the International Center at SIGGRAPH 2001

Petros and Sampson with Mike

Neo, Sampson, and Petros with Judy and Steve at the Pershing Square reception
Instead of trying to describe the activities of each grantee at the conference and the effect of this grant on the grantees’ educational work, we will let each grantee speak for himself or herself in the brief reports each sent to us after the SIGGRAPH 2001 conference. These are appended to this report. It is evident, however, that the conference attendance supported by this grant was very important to the grantees in helping them understand the opportunities in the larger field of computer graphics and will have a very large impact on the grantees’ teaching in the next few years. The success of the Afrigraph 2001 conference, reported elsewhere, is also an indication of the value of this grant, as Petros and Sampson were part of the organizing team for the conference and contributed to its success.

There are two activities that are intended to follow up this grant. In one, Sampson and Petros were part of a panel at the Afrigraph 2001 conference on educational issues in computer graphics, and we had several discussions about the panel at the SIGGRAPH 2001 conference. The panel was presented in November, 2001 at the conference in Camps Bay, South Africa, and was very well received. In another appendix to this report, we are attaching Sampson’s report on the panel and a copy of his slides.

A second followup activity will be a workshop to be held at the University of Botswana in June, 2002, which will be accompanied by a visit to the University of South Africa in Pretoria. This is mentioned in some of the grantees’ reports, and a copy of the flyer we developed for distribution at the Afrigraph 2001 conference as well as a letter to Dr. Ojo, Head of the Computer Science Department at the University of Botswana, to ascertain details for the workshop. We believe that this workshop will be a valuable way to take the things that Sampson and Petros learned at SIGGRAPH 2001, as well as the experience of the workshop instructor, to the computer science community in southern Africa.

In summary, the “Travel Support for Key Volunteers from Southern Africa” grant provided funds to assist four very active and deserving volunteers at a key point in their own development and at a key point for developing activities in southern Africa. In doing so it played a key role in the support for internationalization that is one of ACM SIGGRAPH’s key strategic goals. The effects of this grant will not be fully known for a number of years but we expect it to be a very important part of the development of the region.
1. First of all let me seize this opportunity once more to express my heartfelt appreciation for the grant you awarded to me and my other colleagues to enable us come to the Los Angeles SIGGRAPH 2001 Conference. By the way this was my first attendance at SIGGRAPH Conference.

2. Here at the Department of Computer Science, University Of Botswana, I am the only Computer Graphics teacher, and as a result discussion between myself and other colleagues on the subject (computer graphics) is either non-existent or very little. Prior to my coming to the conference, I would say that my view on Computer Graphics was somehow myopic. My presence at the Los Angeles SIGGRAPH conference has opened my eyes to a lot of things, too numerous to be listed here. I now appreciate and approach the discipline with fun and better understanding. For instance, for the first time, since 1998 I have set specific undergraduate projects that are purely computer graphics for two students. One of these projects is an idea I saw at SIGGRAPH 2001. Also I am going to update my course notes to reflect the modern trends in graphics. From the ongoing discussions, the conference was certainly a boost towards my professional development and style.

3. My general impression for the conference was superb. My appreciations go to the organizer for making such a magnificent conference a memorable one. The Electronic theatres, the Exhibitions, and the Creative Labs were some of the things that I had not imagined its dimensions before coming to the Conference. I really enjoyed and appreciated every bit of it. Above all the Educators Program was a prime concern to me and I made full use of it.
4. At the Afrigraph Conference, I am one of the panelists on Steve Cunningham’s proposal ‘Computer Graphics Education in Southern Africa: Challenges and Opportunity’. I will be talking on the subject “Experiences and Challenges in teaching Computer Graphics at the University of Botswana”. Certainly SIGGRAPH 2001 has made it clear to me the challenges facing our University in terms of Computer Graphics infrastructure and other resources. The SIGGRAPH 2001 conference has highlighted the sort of challenges facing our University and the African continent as a whole. It will give us, the African educators the impetus to forge ahead to contribute more and to seek modern infrastructure for our Computer graphics courses.

5. After attending and observing how things are done in Panels, Sketches, etc, I am more confident in the preparation and presenting of our Panel discussion. It will enable me to contribute my part in setting up an Educators program version for Afrigraph along similar lines with the Educators program of SIGGRAPH.

6. In conclusion, I would say that the 2001 SIGGRAPH Conference has been a tremendous help to me, and I look forward to more such assistance in the future.

Thank you
Sampson D. Asare,
Computer Science Department,
University of Botswana
SIGGRAPH 2001 Grantee report

I would, first of all, like to thank the three organizations ACM, ACM SIGGRAPH, and EUROGRAPHICS for sending a delegation to Southern Africa. This team opened my eyes to this great opportunity of learning about SIGGRAPH. My thanks also go to the members of the team themselves: Judy Brown, Alan Chalmers, Steve Cunningham, Leo Hourvitz and Nan Schaller; for taking time out of their tight schedules to search for the very small country of Swaziland. A very big thank you to ACM SIGGRAPH for their financial support thus making it possible for me to attend SIGGRAPH 2001 in LA.

In terms of benefits to my University (the University of Swaziland) I am already working on modifying the Graphics Course we have in the department. SIGGRAPH 2001 made me realize that one can introduce students to Graphics without necessarily taking them through the theoretical, and mathematical based foundations. Having set down with people like Steve Cunningham and Alan Chalmers made me understand that there is much more out there on Graphics than what I was exposed to. In most of the presentations I learnt that the current trend and market demands are more inclined to multimedia: film making, commercial TV, combining graphics and sound etc which implies that a good introductory course to graphics should make mention of most of the aspects of multimedia – my current course is lacking this area, I need to address it.

Having said that one must add that the conference was so overwhelming that one can’t claim to have fully benefited from a single visit. For one to fully reap and fully enjoy the benefit thereof a second or third visit is quite essential to ensure that all the available resources are tapped into.

Lastly I would like to say that I am looking forward to positively changing the society by providing the necessary tools through graphics integration in the education system and with your support I believe this can be achieved.

Petros M. Mashwama  
University of Swaziland  
Southern Africa
The 2001 SIGGRAPH Conference held in Los Angeles from the 11–17 August 2001 was monumental both in terms of size and content. It was evident that a lot of thought and work had gone into the planning, design and layout of the conference events as well as the provision of accommodation and transport for the participants. The vast array of activities and presentations on offer were exciting and overwhelming. Overwhelming in the sense that there was so much to see and do with some sessions that I wanted to attend overlapping or clashing. This however, is to be expected with a conference of that magnitude. Access to SIGGRAPH Pathfinders on the web as well as on site was very valuable. It provided comprehensive information on the structure of the conference, the nature of the different sessions and how best to prepare for the experience.

What I found especially stimulating during this conference was the Educator’s Program, which generated a lot of discussion and ideas pertaining to the use of computer graphics in different educational set-ups. I also found that it facilitated interaction with other participants because you could identify their areas of expertise from the discussions. Some of the participants even offered assistance. For instance, as a result of The Emerging Computer Graphics Discipline session, I was able to establish a valuable contact with a woman involved with distance education and multimedia from the BBC in London, United Kingdom. The value of this forum is that it made me aware of the fact that the introduction of new technologies such as web-based learning in educational institutions has its challenges and hurdles. Furthermore, there are no quick-fix solutions because it is a process that an institution must go through in order to ensure the effective implementation of such technologies.

As a visual arts practitioner, the other area of interest to me was animation. It was a real treat to have the opportunity to see the diverse approaches animators use to create their films and videos. In addition, these screenings reinforced the growing link between art and science and how they could have a more symbiotic relationship with each other. The 3D Terminator film at Universal Studios rounded off the conference experience nicely because it was so interactive and sensory. At the same time, one was sensitised to the fact that as information and communication technologies become entrenched in the various aspects of our lives, copyright issues will become a minefield because clear-cut, universally applicable laws that govern or regulate the use of these technologies are not in force. Furthermore one wonders how all these complex issues will impact on developing countries which are faced with the hurdle of trying to bridge the digital divide. Perhaps with the help of AFRIGRAPH some of these issues will become less daunting.

The exhibits in the N-Space Art Gallery were diverse, innovative and engaging. I was especially impressed with the range of topics tackled and the variety of media used by the artists to create their images. The installations that I especially thought were beautiful and thought provoking were Secrets of the Magdalen Laundries and Contact Water. With regard to the main exhibition, which showcased the latest developments in the computer graphics industry internationally, it was amazing to see the range and diversity of products on offer, especially the type of effects
that the cutting-edge software can create. I was especially astounded by the sophistication of some of the animation and special effects tools that can reproduce refined graphics such as waves (water), fire, scenery and characters with convincing human-like movement and features.

Within this context, my SIGGRAPH experience will enhance my professional life in the following manner:

The CCE is in the process of integrating of the use of instructional technology, multimedia and video conferencing into its distance education set-up. However, for such technology to be effectively utilised, there must be staff equipped with the requisite level of skills to ensure the sustainability of programmes and to provide technical support to both course developers and learners. The Educators Grant has made it possible for me to gain insight into the possibilities and limitations that face us in our efforts to introduce e-learning and the use of computer graphics. I believe the SIGGRAPH conference has equipped me with a realistic view of the rapidity with which the computer graphics/multimedia environment changes as new innovations are constantly introduced and the realisation that it will not be easy to keep up with these developments.

I am due to go for Masters training in Multimedia, next year. As a result of the exposure I have had at SIGGRAPH 2001, as well as the links I forged with some members of the SIGGRAPH committee, I am confident that I will gain a lot from the Masters programme. To the committee members I wish to say thank you very much for your kindness and hospitality. I sincerely hope AFRIGRAPH grows and becomes a pillar of strength for the computer graphics industry in Southern Africa.

Neo W. J. Matome
Recipient of the SIGGRAPH 2001 Educators Grant
While ACM SIGGRAPH sponsored my attendance of the conference via the greatly appreciated Educator's Grant Program, my own institution supported me financially w.r.t. the travel and subsistence costs. For this I am obliged to deliver a Faculty seminar, explaining the benefit of this trip to me, my department and my university. This is usually an hour presentation with an open invitation to the entire university. I shall document this presentation as a technical report, and shall send a copy to the ACM SIGGRAPH Executive Committee. However, this is on my schedule for early 2002, too late for your purposes.

I spoke to Judy Brown at Afrigraph, explaining this to her. She then suggested that I send you a short preliminary informal report on my impressions of SIGGRAPH 2001. I gladly do this now, knowing that feedback of this kind is of great future value in terms of planning and future initiatives of this kind.

1). My department and I have never before offered Computer Graphics (CG) at undergraduate level. In view of new legislation in SA we had to rethink, plan and register new degree programmes. In this process CG was included in a number of Computer Science programmes, with the obligation of teaching CG at third year level as from 2003. This means that the course development needs to be done in the first half of 2002. I was designated by my HoD, Prof. Paula Kotze', to do this, and consider myself extremely privileged to have been awarded an ACM Educator's Grant to support us in this venture.

2). SIGGRAPH 2001, and in particular the Educator's program, was fantastic. I attended as many tutorials as I could fit in, but was very disappointed not to be able to make it into the OpenGL course. I also attended all the panels and forums concerning Education and Teaching of CG, giving me a good overview of the whole subject, of the different views, approaches, problems, issues, and needs of the entire CG community. The research papers that I attended were selected on the basis of my own interest in numerical analysis, computational methods and algorithms, and also my more recent interest in computational linguistics/natural language processing.

I did not make it to many of the emerging technology presentations, and was lost in the huge exhibition hall. I think that real hardware issues and the growing amount of software will always intimidate me! I found the bookstalls a stimulating and safe haven in the exhibition hall! If I have the opportunity to attend a future SIGGRAPH conference I shall give these a special go! So, to conclude, SIGGRAPH 2001 gave me an excellent overview of the state of the art in CG, and of the current curricula offered at leading and top universities.

3). A very important aspect of my attendance of SIGGRAPH 2001 was that it created the opportunity for me to meet world leaders and experts in this field, in particular the ACM SIGGRAPH Executive Committee. I sincerely hope that these connections and friendships will last far into the future. I was able to have a number of extended discussions with various members of this committee about issues of immediate relevance to me, viz. the development of a CG curriculum for our particular brand of students and our paradigm of distance teaching. I plan to follow up these discussions by email in 2002 when I get down to developing our course. I also look forward to Steve Cunningham's visit to Unisa in June 2002.
4). I have just come back from the Afrigraph conference in Cape Town. It was wonderful to see Judy Brown and Allan Chalmers again. I think that the Afrigraph organization and the associated conference will stimulate research and teaching of CG in SA, and we at Unisa certainly look forward to becoming involved in the future. It seems as if the next conference will be in Cape Town again, but thereafter the Gauteng/Gauteng North region, where we are situated, will be considered.

In conclusion, I hope to develop and offer a top quality CG course in 2003, based on the many valuable insights and support I obtained by getting involved with ACM SIGGRAPH. I am optimistic that a junior colleague will join me on this project soon, and that the teaching of CG will proper at Unisa. If all goes well, the possibility of introducing also a postgraduate course will be investigated.

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REPORT ON THE

PANEL: Computer Graphics Education in Southern Africa: Challenge and Opportunity

Panellists:
S. Asare, University of Botswana, Swaziland
P. Mashwama, University of Swaziland, Swaziland
S. Cunningham, California State University, CA, USA

AT THE

1st International Conference On Computer Graphics, Virtual Reality And Visualization

held at

CAMPS BAY - CAPE TOWN, South Africa,

On

November 5 – 7, 2001
1. Preamble

The purpose of the panel was to discuss the teaching of first Computer Graphics course in the universities in Southern African countries, experiences to be shared by Dr. P. Mashwama and Mr. S. D. Asare of the Universities of Swaziland and Botswana respectively; and that of Prof. Steve Cunningham’s experiences with teaching a first year computer for the past 16 years. Due to circumstance beyond his control, Prof. Cunningham could not attend. He sent in a video (pre-recorded), which was the first presentation to be made. After that Mr. Asare was the next one to present his paper, and finally Dr. Mashwama was the last to present his paper. After these presentations, the panellists then entertained questions and suggestions from the audience. Contributions were mostly in the form of suggestions instead of questions. Below are some of the key suggestions as put forward by a cross-section of the audience. They have been presented in the order in which they were raised beginning with the first to the last.

2. Questions and Suggestions from Audience

After each of us (Petros & myself) presented our papers, we then asked questions from the listeners. For the next 40 minutes, there were contributions and contributions from the public that we just sat and listened to them. It was exactly what we had wanted it to be. People kept contributing. Please find also attached, my slides in order to understand the contributions from the listeners. Listed below are some of the key contributions from listeners.

=> Let students learn to draw from the start of the course to excite their interests

=> Teach students how to use a high-level program to draw (e.g. openGL or C/C++/Java)

=> Prof. Vali Lalioti from the University of Pretoria said that when she introduced Computer graphics in the 4th year, people were not interested because of the Mathematical aspect of it, so she changed and quickly asked the students to begin to draw, draw and draw and she also introduced the course in 3rd year instead of the 4th year.

=> Another contributor also said that, educators must try to make the course interesting by getting the students involved in drawing, animation, and modelling tools, before bringing the mathematical aspects. She said that by the time, one introduces the mathematical aspects, the students are already interested in the course and passion is already there so they can work.

=> Edwin Blake from the University of Cape Town said they also have the same problem of students lacking programming skills (what I call lacking mathematical background, which may not be quite the same as lacking programming skills, but my experience has shown that students who lack mathematical background also are not able to program well.) He supported the idea that Afrigraph should be made a formidable force to lobby and champion the course of CG educators in the sub-region. While in Botswana, computer science education is a three-year program, in South Africa, it is a 4-year program, and with the first three being a general course but the final year being an elective leading to an honours degree. So he was surprised to know that the same situation was happening in Botswana, Swaziland and other possibly other African countries. Still on this problem, one Dave from California, USA also said that the same problem is also experienced there. To this, the whole auditorium burst into laughter because we (me and Patrick) had thought that this was a disease of the developing countries. Another participator from Europe also echoed the same sentiments. Someone said that perhaps it is only in India, where people are more mathematically inclined these days.
Another contributor said that we should use Computer Graphics to explain the beauty of Maths (animation & visualization) instead of trying to use Mathematics to explain the concept of Computer Graphics. This is a point that dawned on me, which until then had never occurred to me that could be done.

Another contributor also pointed that the problem facing us in the Southern African region concerning lack of programming skills/ability is not unique to us alone, but even in UK, the same problem exists there.

Someone said the he had expected Maths to be needed in Computer Engineering but not in Computer Science.

Another contributor also hinted that we could delay the maths aspect until passion comes to students. (In other words, generate passion in students before bringing the maths aspect.)

There was a contribution from yet another member of the public who said that we should use graphical interface to teach computer graphics (this point was not clear to me then and is still not now)

Someone suggested we move the course (CG course) to the first year, but this was deliberated on and it was not accepted by the general consensus that the course be moved to the first year. A number of reasons were given for that: students are just being introduced to programming and can therefore not be expected to programme in computer graphics. Their logical thinking capabilities have not yet developed to a level where they can program well in the first year in computer graphics. A suggestion to move the course to second or third year was generally welcome by all.

Yet again someone raised the question of generating passion in students and in the course so they can get interested.

A contribution from yet another person was for us to structure our course such that the practical aspect is more interesting.

Alan suggested acquiring the Radiance Software to begin with so students get to know how to model and draw in 3D etc.

There was a suggestion to rotate Afrigraph conference from one African Country to another.

3. Conclusion & Future Endeavours

The panel was a success, judging by the number of people who contributed. Contributions were still forthcoming had it not been the fact that it was time for lunch. Participants picked up flyers announcing forthcoming OpenGL workshop in the University of Botswana, Gaborone in June 2002 and we look favourably to the upcoming workshop.
Computer Graphics Education in Southern Africa

Experiences and Challenges in teaching Computer Graphics Course in the University of Botswana

Sampson D. Asare

University of Botswana
OUTLINE

- OUR GRAPHICS COURSE CONTENTS
- STUDENTS ATTITUDES TOWARDS COURSE
- INADEQUATE MATHS BACKGROUND
- ADMINISTRATIVE “RED-TAPES”
- CHALLENGES
- CONCLUSION
OUR GRAPHICS COURSE CONTENTS

- INTRODUCTION
- HARDWARE
- SOFTWARE
- 2D GRAPHICS
- 3D GRAPHICS
- REALISM
STUDENTS ATTITUDES TOWARDS COURSE

- Very interesting at first

- Once the course tends to be mathematical, they tend to lose interest and get a bit disappointed.
Most of my students have very weak math background.

As a result they tend not to like the theoretical aspect of CG.

The idea would have been to have at least two courses (one for theoretical and the other practical-based)
ADMINISTRATIVE “RED-TAPES”

- All attempts to get the dept(faculty) to have at least two computer graphics courses have proved futile.
- With the new semesterisation and joint programs between faculties coming off in August 2002, this is bound to change though.
CHALLENGES

- Fewer CG resource persons in the Dept
- Getting more students into the computer graphics course and not losing the math aspect.
- Getting the authorities to expand the number of graphics courses to at least 2.
- Applying CG in other non-CG courses.
CONCLUSION

- Make Afrigraph a solid and recognizable body in Africa.
- This may help in Afrigraph forging ahead the course of action of CG lecturers in the region.
Computer Graphics Education

Workshop

Anticipated June 10-14, 2001
University of Botswana
Gaborone, Botswana

Instructor: Dr. Steve Cunningham
Gemperle Distinguished Professor of Computer Science
California State University Stanislaus, USA
Past President, ACM SIGGRAPH

Workshop will cover
• Computer Graphics Programming in OpenGL
• Teaching a beginning Computer Graphics course with OpenGL
• Discussions of how computer graphics can address resource development issues in southern Africa

For more details, contact:
• Prof. Sampson Asare, University of Botswana
  asaresd@mopipi.ub.bw
• Prof. Petros Mashwama, University of Swaziland
  petros@science.uniswa.sz
• Prof. Steve Cunningham, California State University Stanislaus
  rsc@cs.csustan.edu

We hope to see you there!
October 22, 2001

Dr. S.O. Ojo
Head, Department of Computer Science
Faculty of Science, University of Botswana
Private Bag UB 00704
Gaborone, Botswana

Dear Dr. Ojo:

After the visit of the ACM SIGGRAPH - Eurographics group to southern Africa in March and April of this year, during which you provided us such excellent hospitality in your department, I thought that it might be useful to develop a workshop on computer graphics for University and Polytechnic faculty members in the region. Several of us discussed this at the ACM SIGGRAPH meetings in Los Angeles in August, and on consultation with Mr. Asare of your department, we decided that the University of Botswana would be an excellent location for the workshop. The workshop would have three components: an introduction to computer graphics programming with OpenGL, an outline of creating a beginning computer graphics course built on that graphics API, and a discussion of problems that are unique to southern Africa and to which computer graphics could provide important assistance in finding solutions. We hope to have about 12 to 15 participants in the workshop from a number of institutions in several countries in the region.

Since then we have been discussing possible dates and arrangements, and we propose to you that we hold the workshop on June 10 to 14. I plan to bring a student to help participants with their projects and to help us make sure the laboratory environment has all the graphics components we need, although my experience is that the kind of PC facilities you have will work well. I expect that we will arrive in Gaborone around June 6 or 7 to help get any needed setup done. I am also working to develop funding to cover all the travel costs for myself and my student as well as all local costs in Gaborone for participants. We thus expect to have no charge to participants for their participation, but will likely need for participants to find funds to travel to Gaborone.

We hope that you will approve of the use of a classroom and a PC laboratory in your department for this workshop. We believe that it will provide a useful resource for computing in your region and hope that hosting the workshop will give the University of
Botswana and your department some measure of recognition for your faculty, program, and facilities. Personally, I look forward to the chance to see you again and to enjoy again the remarkable environment I felt at your University and in Gaborone. Thank you very much for considering this request.

Sincerely,

Steve Cunningham

Cc: Prof. S. A. Siverts, Vice Chancellor, University of Botswana