

ACM SIGGRAPH Education Committee

International Activities Report (2011-2012)

by **Rejane Spitz** (Brazil)
Global Outreach Coordinator
rejane@puc-rio.br

Introduction

One of the major objectives of the ACM SIGGRAPH Education Committee is to help establish a worldwide network of computer graphics educators.

Our international ACM SIGGRAPH Education Committee members have active roles in the planning and organization of education-related Computer Graphics events in several countries, which offers an excellent opportunity for us to exchange information and promote our ACM SIGGRAPH educational activities worldwide.

Our current International Representatives are:

- **Gitta Domik** (*Germany*) – **European Representative**
- **Rejane Spitz** (*Brazil*) - **South American Representative**
- **Zhigeng Pan** and **Weihua Gao** (*China*) – **Asian Representatives**

In this report we present several international educational activities, events and conferences in Computer Graphics and related areas in which our Committee members and International Representatives have been and/or are actively involved in 2011-2012, aiming at showing the scope and diversity of our international network.

Report from Europe

by **Gitta Domik** (*Germany*)

Here are the European Education Activities for 2012:

1. The Eurographics Education Papers were held on May 17th, 2012, at Eurographics 2012 at Cagliari, Sardinia. Giovanni Gallo and Beatriz Sousa Santos (co-chairs of the education program) put together an excellent program:

- Visualization Curriculum Panel – or: The Changes We Have Made to Our Visualization Courses Over the Last 10 Years. Panelists: G. Domik (University of Paderborn), D. Ebert (Purdue University), J. Kohlhammer (Fraunhofer IGD), H. Rushmeier, (Yale University), B. Sousa Santos (University of Aveiro), D. Weiskopf (Universitaet Stuttgart).
- Adaptation of Electrical Laboratory Systems though Augmented Reality for Optimization of Engineering Teaching University. J. Martin-Gutierrez (Universidad de La Laguna), B. Peña Fabiani (Universidad de La Laguna), M. D. Meneses Fernandez (Universidad de La

Laguna), L. Abselan (Universidad de La Laguna), D. C. Pérez- López (Inter-University Research Institute for Bioengineering and Human Oriented Technology (UPV)).

- Evaluation of an Augmented Reality Enhanced Tabletop System as a Collaborative Learning Tool: A Case Study on Mathematics at the Primary School. G. Salvador (ESET, Universidad CEU Cardenal Herrera, Spain), D. Pérez (i3BH), M. Ortega (i3BH), E. Soto(i3BH), M. Alcañiz (i3BH), M. Contero (i3BH)
- Evaluation of a Curriculum for Technical Artists. V. Sundstedt (Blekinge Institute of Technology), M. Lanner (Blekinge Institute of Technology)
- Teaching 3D acquisition for Cultural Heritage: a theory and practice approach. M. Dellepiane (Visual Computing Lab, ISTI-CNR, Pisa, Italy), R. Scopigno (CNR-ISTI)
- Building a Serious Game to Teach Secure Coding in Introductory Programming Courses. N. Adamo-Villani (Purdue University), M. Oania (Purdue University), J. Brown (Purdue University), D. Whittinghill (Purdue University), S. Cooper (Stanford University)
- Next Generation Handheld Graphics Edutainment for Learning in an Adaptive Student Centric Environment: Constraints and Benefits. I. Cheng (University of Alberta), O. Bilash (Department of Education, University of Alberta), W. F. Bischof (Computing Science Department, University of Alberta), A. Basu (Computing Science, University of Alberta)
- TECHNI Photons: Evolution of a Course in Data Structures. A. Duchowski (Clemson University)
- Evaluation of Students' Skills in Remote Collaboration for Creative Problem Solving in Computer Graphics. T. McLaughlin (Texas A&M University), S. Keske (Texas A&M University)
- Distance Learning in Computer Graphics. M. Fairen (Universitat Politècnica de Catalunya), A. Chica (Universitat Politècnica de Catalunya), N. Pelechano (Universitat Politècnica de Catalunya)
- Teaching a modern graphics pipeline using a shader-based software renderer. H. Fink (Vienna University of Technology, Institute of Computer Graphics and Algorithms), T. Weber (Vienna University of Technology, Institute of Computer Graphics and Algorithms), M. Wimmer (Vienna University of Technology, Institute of Computer Graphics and Algorithms)

2. On May 19, 2012, a „Visualization Curriculum Workshop“ was held at the University of Cagliari, Sardinia, sponsored by the SIGGRAPH Education Committee. It was a follow-up on the Visualization Curriculum Panel at Eurographics 2012. Participants were David Ebert, Beatriz Sousa Santos, Holly Rushmeier and Gitta Domik.

Report on Visualization Activities

by *Gitta Domik*

Within the Education Committee I am responsible for education activities, developing resources and providing information in and on computer-generated visualization. I try to provide information and materials through my website and through my publications. The following education activities were accomplished between September 2011 or are planned for SIGGRAPH 2012:

1. The ACM SIGGRAPH Education Committee Website (<http://www.unipaderborn.de/cs/vis>) has been updated for new activities. This is the website that is linked to from the SIGGRAPH Education committee website <http://education.siggraph.org/resources>.

2. At Eurographics 2012 (Education Track) Gitta Domik organized and chaired the Panel "Visualization Curriculum Panel – or the Changes We Have Made to Our Visualization Courses over the Last 10 Years" with the following speakers: D. Ebert (Purdue University), J. Kohlhammer (Fraunhofer IGD Darmstadt), H. Rushmeier (Yale University), B. Sousa Santos (University of Aveiro) and D. Weiskopf (University of Stuttgart). Motivation for this Panel were the necessary changes in the visualization curriculum due to the profound changes in computer-generated visualization algorithms, techniques, methodologies and applications of visualization of these last 10 years, such as:

- improved algorithms for flow or volume visualizations;
- a strong emphasis on highly interactive visual interfaces;
- the advent of visual analytics;
- changes in the "average student" we teach in visualization courses;
- greater needs for professional use of visualization at the future work place;
- evaluation frameworks for effective visualization. All this forces alterations to our visualization courses, especially what, how, or whom we teach.

The five panelists (of which only three were present due to illness) reported directly or by their submitted slides of their visualization courses, noted changes over the years and current and future challenges. Here a very abbreviated summary of their talks:

- David Ebert presented goals, content and experiences of his Visual Analytic course. He developed this course over the last years and it has become a model course syllabus at many other universities.
- Holly Rushmeier reported on the demand by Yale university students for visualization courses that do not require technical background. Like Jörn Kohlhammer, who also teaches to a mixed audience at the University of Darmstadt, she puts much thought into their use of visualization later on in their work life. This means meaningful practical exercises, reproducing real world use cases in different disciplines, and using, rather than developing, visualization techniques with non-technical students.
- Beatriz Sousa Santos claims we need to make students increasingly aware of evaluation of effective visualizations ("students must learn to recognize and develop correct and

efficient visualizations"), interaction techniques and the influence of displays (changing capabilities, such as size, spatial and tonal resolutions, memory, processors).

- Daniel Weiskopf at Stuttgart University teaches all shades of courses from computer graphics to visualization. He also offers a large-scale team visualization project lasting one year. He points out the growing need for background knowledge from diverse fields, e.g. data mining and machine learning, perception and HCI various domain knowledge, additionally to graphics expertise, when teaching visualization.

The slides of all speakers are available and online at <http://www.unipaderborn.de/cs/vis>.

3. On May 19, 2012, a „Visualization Curriculum Workshop“ was held at the University of Cagliari, Sardinia, sponsored by the SIGGRAPH Education Committee. Participants were David Ebert, Beatriz Sousa Santos, Holly Rushmeier and Gitta Domik. During the morning, workshop participants followed up on the issues as discussed at the Eurographics Panel “Visualization Curriculum Panel – or the Changes We Have Made to Our Visualization Courses over the Last 10 Years”. Since the early 1990s, teaching Visualization has been part of the Computer Science curriculum at many universities world-wide, but applications, methods and technologies have changed since then. It seems currently appropriate to make a distinction between

- data visualization,
- information visualization and
- visual analytics

though many commonalities exist and all of these can be summarized under the heading of “visualization”. To shortly summarize some significant data differences,

- in data visualization, data dimensions usually coincide with physical dimensions, such as in medical or remote sensing or flow data,
- information visualization typically deals with multidimensional data as in finances, business intelligence, or large databases and mostly physical dimensions are not present
- in visual analytics, data is characterized by large, complex, and heterogeneous data sets.

The rest of the workshop was spent in discussing the following proposed outline of the following 11 themes to teach “visualization”, where additions and distinctions must be used if focusing on a specific type of visualization.

The 10 themes were taken from previous curriculum suggestions and are as follows:

- Definitions and History of Visualization.
- Data. This includes models, transformations, data characterization as well as data manipulations

- The User. This includes the human information processing limitations and capabilities as well as the task that a user brings to the visualization problems
- Design stage. This stage describes a careful mapping of data components to visual attributes
- Visual Presentation Techniques. This should include a wealth of visualization solutions, sorted by data characteristics, by application domain, and/or by task, and described by their various parameters. This theme can be presented at the breath-level by showing and discussing (interactive) visualizations. It can be trained by using available tools at the breadth-level or in-depth by developing interactive visualization techniques on a GPU, or in any breadth/depth stage in between, depending on the qualifications of students.
- Interaction techniques. While interaction techniques are a demand per se for Visual Analytics, they are increasingly also present and demanded for data and information visualization, where GPU techniques can reach the necessary processing speed.
- Communication. A focus on production, presentation and dissemination as part of the visualization process was raised by visual analytics, but needs to be observed as well for data visualization and information visualization.
- Collaboration. Interactivity aids collaboration, but other issues are of concern in the collaboration among stakeholders.
- Evaluation. Evaluation is seen as a continuous process, starting with the requirement analysis of the visualization problem, continuing as a constant awareness process of the human-in-the-loop of software processes towards a visualization goal, and ending with evaluation techniques to secure reaching this goal for the specific visualization problem.
- Displays. Different capabilities of displays (size, memory, processors) pose problems on visualization techniques, interactivity and communication and need to be treated at least at the Mapping/ Design stage.

It was decided to have these preliminary discussions continued at the BOF "Visualization and Visual Analytics Curriculum" at SIGGRAPH 2012.

4. At SIGGRAPH 2012, August 6, 4-5 pm, there will be a BOF "Visualization and Visual Analytics Curriculum", co-chaired by Scott Owen and Gitta Domik. At this BOF, results of a mini-workshop sponsored by the SIGGRAPH Education committee and held at Eurographics 2012 will be presented and discussed with participants. The goal is to update the ACM SIGGRAPH visualization curriculum guidelines.

5. Another source of information for visualization and graphics educators is the new Education Department at IEEE Computer Graphics and Applications (Editors: Gitta Domik and G. Scott

Owen). Between September 2011 and June 2012 the following articles were published through this department:

- Integrating User Studies into Computer Graphics-Related Courses, by Beatriz Sousa Santos, Paulo Dias, Samuel Silva, Carlos Ferreira, and Joaquim Madeira, IEEE Computer Graphics and Applications, Vol. 31, No. 5, pp. 94-96, September/October, 2011
- Fostering Collaboration and Self-Motivated Learning - Best Practices in a One-Semester Visualization Course, by Gitta Domik, IEEE Computer Graphics and Applications, Vol. 32, No. 1, January/February 2012
- Digital Media and the Beginning Designer, by Glenn Goldman, IEEE Computer Graphics and Applications, Vol. 32, No. 2, March/April 2012
- Leveraging Multidisciplinarity in a Visual Analytics Graduate Course, by Niklas Elmqvist and David S. Ebert, IEEE Computer Graphics and Applications, Vol. 32, No. 3, May/June 2012

Report from South America

by Rejane Spitz (Brazil)

In parallel with my SIGGRAPH activities, I have been conducting several other volunteer activities throughout this year, as a member of the Executive, Advisory, Scientific and/or Organizing Committees at several Conferences in South America. Said volunteer activities help me promote ACM SIGGRAPH educational activities and events through different communities, by building a major international network linking the areas of Art, Design, Architecture, Computer Graphics and Science.

I have also been involved in several international teaching activities (at the Doctoral level), as a result of a partnership established between PUC-Rio University (Brazil) and Pontificia Universidad Catolica de Valparaiso (Chile), in 2011, and between PUC-Rio University (Brazil) and Universidad Iberoamericana (Mexico), in 2012. Through these activities, I have had the opportunity to disseminate SIGGRAPH and its educational activities to numerous professionals in Latin America, including my Chilean and Mexican PhD students in their respective fields of Art, Design and Architecture. Prior to these conversations, the majority of them were not aware of SIGGRAPH and are now interested in becoming participants in the association and its related conferences.

In 2011-2012 I have been involved in establishing links and promoting our ACM SIGGRAPH Education Committee initiatives at the following conferences and events, held in South America:

a) in Brazil:

1- SIIMI - 1º Simpósio Internacional de Inovação em Mídias Interativas (*First International Symposium of Innovation in Interactive Media*), 9-11 May 2012

A three-day symposium held at the Media Lab - Federal University of Goias (Goiania, Brazil).

As an invited speaker, I had a chance to promote our ACM SIGGRAPH educational activities during a talk I gave to approximately 300 attendees (mainly students and professionals in the area of Interactive Media) and surprisingly the majority of them were not aware of SIGGRAPH.

Other invited speakers of this Symposium were Derrick de Kerckhove (Canada), Hannah Drayson (UK), Maria Pia Rossignaud (Italy), Guto Nobrega (Brazil), Lucia Santaella (Brazil), Suzette Venturelli (Brazil), Guiherme Xavier (Brazil), among others.

More information can be found at http://www.medialab.ufg.br/siimi/?page_id=15/&lang=en

2- Academia Digital (*Digital Academia*) – a seminar held at Casa da Ciência, at Rio de Janeiro's Federal University, on 25 May 2012, organized by the Programa Avançado de Cultura Contemporânea (*Advanced Program on Contemporary Culture*).

The aim of the Seminar was to discuss possible networking and collaborative projects among major media labs and academic digital media centers in Brazil. A group of 20 outstanding digital media professors and industry professionals from different parts of Brazil was invited to present their current work and research activities. Participants included Alex Primo, Guto Nobrega, Sergio Amadeu, Silvia Laurentiz, Rita Lima, Eugenio Trivinho, Christo Nóbrega, Guido Lemos, Heloísa Buarque de Holanda, among many others.

In my talk, I mentioned my role as SIGGRAPH Global Outreach Coordinator, and encouraged participants to get involved and attend SIGGRAPH conferences.

3- Projeto “ARTE COM CIÊNCIA” (“*Art with Science*” Project) - Sergipe, Northeast of Brazil, October 2011

Is a project organized by IPTI - Instituto de Pesquisas em Tecnologia e Inovação (*Institute for Research in Technology and Innovation*), sponsored by FINEP, which aims at promoting art+science education in high schools located in very poor communities in the State of Sergipe (Northeast of Brazil).

I was invited to participate as a Juror, and helped select the best projects developed by high school students from the Arabela School (located in the city of Estancia, Sergipe) and from the Raimundo Neto School (located in the city of Indiaroba, Sergipe). Two projects were selected: a solar stove (a low cost solar energy device, which can be built by the user) and a project focusing on promoting consciousness on protecting animals which live in the mangrove, in special two kinds of crustaceans typical from the region: *Aratu* and *Caranguejo-Uçá*. The original projects had been developed by those students and teachers using very limited resources and technical skills, and now the Department of Art & Design at PUC-Rio University will transform those ideas into interactive installations which will become part of a collection of a museum of Art & Technology to be created in Sergipe, focusing on interactivity and science education. In 2013, 3 more projects will be selected from a series of art, science and ecology fairs which will be held in certain schools in Sergipe in October 2012, and will also be transformed into interactive installations by the team of PUC-Rio's Department of Art & Design.

By participating in this project, I had a chance to talk with teachers from those poor communities about the importance of computer graphics and digital media education. Through this project, those students will be exposed - for the first time in their lives - to high-end technologies, in the areas of animation, game design and interactive displays. ACM SIGGRAPH's Education Committee can play an important role by supporting projects such as this one. Also, materials such as computer animation festival DVDs, for instance, would be of great interest to these kids, and could be donated to these schools.



b) in Argentina:

1- SIGRADI 2011 - November 16- 18, 2011

The XV SIGraDi conference took place in Santa Fe, Argentina.

It was organized by the School of Architecture, Design and Urban Planning (Facultad de Arquitectura, Diseño y Urbanismo) of the Universidad Nacional del Litoral through its Center of Informatics and Design, CID.

The Conference's theme was "*Augmented Culture*", and keynote speakers were Lev Manovich, Dale Herigstad, Ivan Ivanoff and Marcos Novak.

Most of SIGRADI's attendees are educators. I worked as a collaborator in the organization of the event, and had the opportunity to encourage attendees to join and attend SIGGRAPH conferences and its educational related events.

More information can be found at <http://www.fadu.unl.edu.ar/sigradi2011>

Report from Asia
by Zhigeng Pan (China)

1- SIGGRAPH Asia 2011 - Thursday, 15 December

Approaches and Challenges towards Animation Education

Animation is being taught in schools all over the world at various levels of success. In this panel we wish to explore current approaches towards animation education and share best practices as well as the challenges facing these schools. Aspects such as policies, enrolment and class management issues to curriculum structure, pedagogy and success stories can be brought up and discussed to find out how animation institutions are effectively educating their students and preparing them for their roles in the industry. Towards the end of the panel we can also explore future developments in animation education and possible challenges that lie ahead.

Moderator

Ahmad Al-Mahir Abu Bakar
Singapore Polytechnic

Weihua Gao

Animation School of Communication University of China