Presented at August 3–7, New Orleans

Chair’s Statement
Marc J. Barr

Through this annual report, the ACM SIGGRAPH Education Committee aims to help the SIGGRAPH community become more familiar with its year-round education and conference-based activities, and seeks to demonstrate ways in which passionate members of the community can participate.

The past year brought important changes to our format and contents. The pages of this 2009 Annual Report contain detailed descriptions of the various activities of our subcommittees and also presents an elaborate celebration of the spectacular work of students from around the globe who participate in our prestigious annual juried competitions.

The Subcommittees

Curricular and Instructional Resources (C+IR) is responsible for managing the Curriculum Knowledge Base (CKB), the Computer Graphics Educational Materials Source (CGEMS), the cgSource education resource collection, Visualization education, and the Digital Art Curriculum Framework project.

Community Building and Support administers the Education Committee Website, the Education Index, Games and Interactive Media, Primary / Secondary Education (P/SE), the Undergraduate Research Initiative, and all Global Outreach, and Conference Activities.

SpaceTime conducts the SpaceTime Student Competitions and Exhibitions.
ACM SIGGRAPH Education Committee Report

Computer Graphics Materials Source (CGEMS)

Coordinators: Frank Hanisch, Joaquim Jorge
Additional Contributors: Frederico Figueiredo, Colleen Case

The Computer Graphics Materials Source (CGEMS) is a peer-reviewed online repository publishing curricula, course modules and syllabi, lab notes, problem sets, teaching gems, and student work. It is a continued, joint effort of the ACM SIGGRAPH Education Committee and Eurographics Education Board to offer peer recognition in computer graphics education and to make available excellent, ready-to-use teaching materials worldwide and for free, ensured by Creative Commons licensing. Each material is documented with educational goals, methodology, and assessment, and undergoes critique by long-term educators, professionals, and artists. More than 60 reviewers from 13 countries are involved.

After two fruitful years that provoked 15 (2007) and 11 (2008) submissions in all categories, we have experienced a dropdown with the 2009 call for materials to only 6 submissions. We have therefore rescheduled our competition to a bi-annual cycle, modeling after the SIGGRAPH awards, which allows for more quality submissions and a longer two years to showcase winners. We are further planning to offer CGEMS users a restricted area where they can download additional material to a given CGEMS module. Materials that feature programming assignments (like lab notes) cannot include all source code, since that would provide students a solution for their task. On the other hand, it would be very useful to have that solution available for teachers. Note that for programming materials published under GNU General Public License authors must either accompany the complete source code or at least furnish it on request.

Call for Materials

We are collecting educational material showcasing best examples of teaching in Computer Graphics and Digital Arts. If you have developed valuable content in the field, publish it at CGEMS and shape your academic identity.

CGEMS and shape your academic identity.

Curriculum

The body of knowledge of a specific curriculum with knowledge areas, units, and exemplary topics.

Course Syllabus

A course description with a sequence of educational units, course requirements and student readings.

Complete Module

A self-contained, single-topic teaching unit, e.g., a book or course slides.

Lab Notes

An annotated laboratory session with a list for materials, equipment, and procedures required to conduct experiments.

Problem Set

Student assignment with underlying rational and structure.

Teaching Gem

An innovative bit of teaching material that highlights an approach to teaching a particular problem.

Authoring guidelines and templates are here.

Education Index

Tereza Flaxman

The Education Index is a comprehensive online database of educational programs in computer graphics and related fields. It’s been serving the international academic community, students and the general public for three years. It currently lists 542 academic programs with emphasis in animation, gaming, and visual arts.

A new interactive interface was published online in January 2008. Since then, hundreds of people from several continents have searched the database. The database size has grown by approximately 1/3 over the last year. However there are hundreds if not thousands of other programs that should to be included. We invite members of the global education community to enter their programs.
ACM SIGGRAPH Education Committee International Activities

Global Outreach Coordinator & South American Representative
Hepiane Spitz (Brazil)
Asian Representatives
Zhigang Pan and WeiHua Gao (China)

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

The Education Committee initiated international activities in 1991, by appointing an international representative in South America. Worldwide connections and events have substantially grown since then. Today, our Education Committee is truly multinational and cross-cultural. There are volunteer members from North and South America as well as Asia and Europe. This is only the beginning of an inclusive and much broader educational network of computer graphics educators. Our 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.

The workshop explored the meaning of “context” for teaching computer graphics. Following a thorough discussion, a distinction in teaching computer graphics emerged: the difference between

- teaching computer graphics using a context from a different field (students will emphasize in most cases on computer graphics programming), and

- teaching a subject in a computer graphics context (students will emphasize in most cases on computer graphics design).

The former means to choose to use a context (e.g. the sciences) for course examples and projects to teach computer graphics. Students are challenged to develop graphics, usually through programming. The latter means to teach computer graphics in a course on a different subject, e.g. visualization within a science program. Students may use tools and scripts to design graphics. Discussions about these distinctions led to a number of questions and plans for subsequent workshops and BOF’s.

The workshop was financially supported by ACM SIGGRAPH Education Committee, Eurographics, the Technical University of Munich, and, last but not least, NSF.

Education Programme at Eurographics 2009 co-chaired by Gitta Domik and Ricardo Scateni (March 31–April 1, 2009). This year’s program had 12 presentations in four sessions:

- Games in Education (chaired by Ricardo Scateni) included the paper Applications of Multitouch & Gaming Technology for the Classroom, presented by W. Muto (co-authors J. Dobies and P. Diefenbach) from the Antoinette Westphal College of Media Arts and Design, Drexel University. Building on their system “Planet Diggam,” they created a novel teaching tool by combining the multitouch interface with 3D simulations and gaming technology.

- Teaching more than the standard CG Curriculum (chaired by Scott Owen) also consisted of three talks: The first paper Introducing Students to Empirical Methods in CG and HCI Courses through User Studies was presented by B. S. Santos, P. Dias, S. Silva, and C. Pereira, all of the University of Aveiro, and J. Madeira, of the University of Lisbon, Portugal. It argues the importance of teaching empirical methods. The authors involve students at various academic levels into user studies, either as experiment designers, experimenters or participants, to both get them acquainted with the methods and have them observe the results of the experiments. J. McDonald (DePaul University) then presented Teaching Quaternions is not Complex, where he developed a clear introduction to quaternions useful for computer graphics students enabling them to manipulate and develop quaternions for 3D applications. In the next contribution How to Write a Visualization Research Paper: A Starting Point, the author Robert S Lazanee from Swansea University, UK, focused on advanced students, and developed a guideline for graduate students doing research in visualization. This session was awarded with the two best papers. Quaternions and Visualization Research will be additionally published in the Computer Graphics Forum.

- Interdisciplinarity (chaired by Gitta Domik) was dedicated to teaching interdisciplinary students or interdisciplinary concepts. M. Schwegge from the School of Design and J. Geigel from the Department of Computer Science, both from the Rochester Institute of Technology, summarized their coordinated efforts over the last five years in Teaching Computer Graphics in the Context of Theatre. Also in this session, Steve Cunningham and Colleen Case presented a first report on results of the Computer Graphics Education on Workshop.
April 2009 Eurographics Education Board Meeting It was agreed that there should be future Education Workshops, but funding these workshops should be dealt with early on in the planning stage.

For Eurographics 2010, to be held May 3-7, 2010, in Norrköping, Sweden, Lars Kjellåhl (KTH, Stockholm) and Gladimir Baroński (University of Waterloo) will co-chair the Education Programme.

Report from Asia
Weihua Gao & Zhigeng Pan (China)

SIGGRAPH Asia 2008: A Platform for CG Educators Sharing Ideas ACM SIGGRAPH kicked off its first SIGGRAPH Asia conference in Singapore (December 10 -13, 2008). More than 3,200 attended and 49 countries were involved in this creatively inspired conference. About 80 percent of the attendance came from Asia-Pacific countries, including Australia and New Zealand.

On the exhibition floor, the SIGGRAPH village occupied a large area comprised of the ACM SIGGRAPH Executive Committee, the ACM SIGGRAPH Education Committee, the SIGGRAPH Asia 2009 Committee, among other committees. The ACM SIGGRAPH Education Committee presented its education-related activities and resources to the public, and also screened the 2008 SpaceTime student competition demo reel. Our educational online resources, such as CGEMS and cgSource, attracted much attention from the educators and researchers.

The Educators Program chaired by Prof. Mark Chavez was a highlight of the Asia conference. The program included 9 forums with a total of 29 presentations, covering topics such as Methodologies in Learning, Methodologies in Teaching, Game Education, The Mindspace of Learning, Professional / Academic, and more. The ACM SIGGRAPH Education Committee’s Asian Representatives Prof. Weihua Gao and Prof. Zhigeng Pan co-chaired the Game Education and Professional & Academic sessions. Speakers from around the world shared their creative ideas, achievements, and experiences in animation, multimedia, and game education. This facilitated a useful dialogue between the east and west.

Following tradition of SIGGRAPH conferences, the Asia conference consisted of featured speakers, Courses, Papers, Educators program, Computer Animation Festival, Exhibitions, Art Gallery, Emerging Technology, and so forth. The wide diversity of programs served the needs of artists, researchers, developers, gaming experts, filmmakers, and academics in the rising Asian regions.

The [Aniwow!]2008 3rd International Student Animation Festival, initiated by the Communication University of China, was held October 22–25, 2008 in Beijing. It has become a regional and an international student animation festival. Adhering to the principles of authority, originality, academic stress and internationalization; [Aniwow!]2008 welcomed experts and friends from the world animation and digital media communities to join in, to communicate with young generations and masters from the china animation industry, and to experience the ancient history and the modern charming in the city of Beijing. Programs included “White Poplar” Awards for international college students, Film Screening, Master’s Classes, Workshops, TV Animation forum etc. The festival set up a globally platform for educators, researchers, filmmakers to share their perspectives and to stimulate the young people. [Aniwow!]2009, organized by the Communication University of China and sponsored by Beijing KAKU Cartoon network, will be held October 22–25, 2009. The call for entries was published in mid-June.

2009 ASIAGRAPH Shanghai Scott Owen, president of ACM SIGGRAPH, attended this event and was invited to give a talk.

2008 ASIAGRAPH Tokyo Professor Zhigeng Pan, of our Education Committee, was invited to give two talks at this conference (Application of VR to Digital Olympics and Animation affairs in China).

2008 YACC, Yang Asia Cartoon Festival (July 2008) Guiyang, China There were about 1,000 attendees at all over the world. The event included discussions on the creation of animation, and the exhibition of animation and cartoon productions.

Edutainment 2008: International Conference on E-Learning and Games, (June 2008) Nanjing, China There were about 150 attendees from 15 different countries. The conference included six invited speakers, and 12 parallel sessions discussing themes such as E-learning, Games, Virtual Reality, among others.

Report from South America
Rejane Spitz (Brazil)

Computer Graphics conferences (as well as conferences and events on Electronic Art, Games, Entertainment and other CG related subjects) are excellent venues for connecting to educators and encouraging them to join and participate in ACM SIGGRAPH events and initiatives, thus expanding our educational network in South America.

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. Those volunteer activities help me promote ACM SIGGRAPH educational activities and events through different communities, by building a major international network linking Art, Design, Architecture, Computer Graphics, and Science.
In 2008–2009, we were markedly involved in establishing relationships and promoting ACM SIGGRAPH Education Committee initiatives at the following Brazilian conferences:

**SBGames 2009 Brazilian Symposium on Games and Digital Entertainment** (October 2009), Rio de Janeiro. The conference is to be hosted by PUC-Rio. Our Committee’s South American Representative, Rejane Spitz, has been invited to take part in the SBGames 2009 Advisory Committee, and has established a fruitful collaboration between SBGames and ACM SIGGRAPH. As a result of this connection, Susan Gold (ACM SIGGRAPH Education Committee’s Game Education Representative, and member of IDGA International Game Developers Association) has been invited as the Keynote Speaker for the 2009 Conference.

**Anima Mundi International Animation Festival** (July 2008, July 2009), Rio de Janeiro & Sao Paulo. The major Animation Festival in South America, ANIMA MUNDI is held annually. Last year, we helped to introduce Marcos Magalhaes (member of the Organizing Committee of ANIMA MUNDI and Professor at PUC-Rio University) and Patricia Beckman (Chair of SIGGRAPH 2007, 2008, and 2009). This collaboration may likely increase participation of South American animators at SIGGRAPH.

**SIGRADI 2009 Conference** (November) Sao Paulo. The Ibero-American Association for Computer Graphics (SIGRADI) organizes this annual international symposium. It’s hosted by educational institutions located in different Ibero-American countries. SIGRADI symposiums offer an excellent opportunity for us to share with CG educators from Latin American countries.

**SBDI Conference 2009** (September), Rio de Janeiro. A biennial international conference, it’s organized by the Sociedade Brasileira de Design de Informação. In 2009 the conference will be hosted by PUC-Rio.

**ACM SIGGRAPH and LEONARDO/ISAST** We’ve established a partnership with The Journal of the International Society for the Arts, Science and Technology (LEONARDO / ISAST), whose projects, publications, and activities draw CG professionals from around the world.

In 2009, ACM SIGGRAPH Art Papers will be published in a special issue of LEONARDO. Roger Malina (Chief Editor of the LEONARDO Journal) has suggested that ACM SIGGRAPH Education Papers could also be published in another special issue of LEONARDO.
Teaching Computer Graphics in Context

Organizers: Colleen Case, Schoolcraft College, Steve Cunningham, Brown Cunningham Associates

2009 Computer Graphics Education Workshop Munich, Germany (March 31–April 1, 2009). This workshop was organized to explore ideas in computer graphics education with a focus on teaching computer graphics in context. While previous workshops have focused on designing the computer graphics curriculum, this workshop recognized the importance of designing the students’ learning experience within the curriculum. The workshop was held immediately before the Eurographics 2009 conference in Munich, Germany and was co-sponsored by Eurographics and ACM SIGGRAPH. Participation was by invitation based on submitted position papers.

The workshop began with an exploration of what “context” means for teaching computer graphics. The wide variety of kinds of computer graphics education among the participants led to some interesting discussion of the relationship between the computer graphics and the context in different fields. This led us to uncover a very interesting distinction in teaching computer graphics that had not fully emerged in other workshops:

- teaching computer graphics using a context from a different field, and
- teaching a subject in a computer graphics context.

This distinction was sometimes difficult to keep clear, but let’s consider the case of computer graphics and the sciences. If you teach a computer graphics course (for example in a computer science program) you might choose to use a context of the sciences for course examples and projects; this is teaching computer graphics using a context. Or you might teach computer graphics in a course on visualization within a science program (for example, physics or chemistry); this is teaching the science in a context of computer graphics.

Another way to think of this is shown by the figure to the right. Let’s consider the two areas of computer graphics and the context field as disks having RGBA color and with the alpha of 0.6. The overlap area then represents the teaching where the computer graphics and the context field overlap. You see that the two overlap areas have quite different colors: in the top area, the overlap is primarily computer graphics, but with some content from the other field; in the bottom area, the overlap is primarily the other field, but with some content from computer graphics. Whichever way you think about it, this distinction affects the way computer graphics is taught by faculty and learned by students. With this distinction in mind, the workshop focused on how we can think of each of these two approaches and how the approach changes the nature of the sciences and computer graphics instruction. It is important to note that these approaches are not separated by a bright, clean line; several of the workshop participants teach courses with both approaches, and some courses can easily be viewed as falling into both camps. This distinction should be approached with some caution.

Teaching a Subject in a Computer Graphics Context

Some examples of this approach help to illustrate its breadth. At the workshop we saw:

- Engineering design, using modeling tools tutorials for student design project work.
- Architectural design, where students use many graphics applications to learn the attributes of the tools. Learning reflects the students’ need to achieve particular results and is supported by consulting with faculty.
- Scientific visualization, where students learn principles, approaches, and methods for visualizing scientific data and principles. As the tools have evolved, this field needs less programming and tool development.
- Program design, where computer science students use graphical tools such as Alice to learn programming and computational thinking.
- Animation, where the emphasis is on principles of effective visual communication and tools are used but not emphasized.

A common theme in these is the use of computer graphics as a design tool, and the courses where computer graphics is taught or used often emphasize the design process. One approach is for students to produce a product and learn to work collaboratively, to develop communication skills, and to develop work iteratively through testing, debugging, and error checking as they build insight into the design. Another approach is for students to use computer graphics to explore a subject through simulation or animation, and to learn how to communicate with colleagues and clients graphically.

There are some common graphical themes in all these areas. Students need to learn an appropriate level of computer graphics concepts and skills, often involving visual language skills through some level of scripting or programming. These levels should adapt to the students’ projects and should grow as the students’ skills and concepts develop. However, the computer graphics is always learned as a means to an end, and the end lies in developing the ability to work in the subject field. We discovered context as a way to become experimenters in designing experiences that will enhance students’ ability to function in the world and deal with complex problem solving and innovation.

Teaching Computer Graphics Using a Context Courses in this group focus on computer graphics concepts, principles, and projects using programming or scripting. They may vary in emphasis placed on topics in computer graphics and on the depth of the topic discussion.
They need not be in a technical field such as computer science or engineering; examples were given of such courses in several other fields. Two themes that ran through all these courses, however, were that the context motivates and reinforces the learning about computer graphics, and that the context should help students learn about visual communication using computer graphics.

Computer graphics courses find their homes in many different programs or departments. In many of these, there is a natural way that computer graphics contributes to the field, and that can provide a natural set of topics for examples and student projects. If the course is organized to take advantage of these topics, we say that the course uses an intrinsic context. On the other hand, if a course is in a field where there is no natural way that computer graphics contributes to the field, or if the course uses topics outside the area of the field, we say that the course uses an extrinsic context. Some computer graphics courses in these fields along with computer graphics courses in computer science or engineering use an extrinsic context.

Courses with Intrinsic Context

Courses in this group use the natural topics from the field hosting the graphics course to provide examples and student projects. The fact that there is a set of topics that can be drawn upon for a context makes it straightforward to select examples and student projects. Such courses include:

- A computer graphics course in an animation program that focuses on animation algorithms and that develops animations for the theater and for physics simulations.
- A computer graphics course that focuses on modeling with specific work in theatre, sculpture, interior design, fine arts, games, and illustrations.
- A computer graphics course in a fine arts program that focuses on computer graphics principles and on developing visual language through programming and scripting.
- A course on scientific visualization that focuses on computer graphics principles but emphasizes techniques for creating scientific communications. This group of courses may come from fields where there are other courses taught in a computer graphics context. For example, you may find a computer graphics course in an architecture program, and you are likely to find a computer graphics course in engineering.

Courses with Extrinsic Context

Although in principle this kind of course could come from many fields, those discussed at the workshop came from computer science. The contexts that were mentioned for such courses included:

- The sciences and mathematics, including displaying surfaces and models of various scientific concepts and principles.
- Data display, where examples included environmental data, election data, and medical data. Some specific areas of interest include CT and MRI data.
- Games of various kinds, with emphasis on so-called “serious games” that can include teaching games.
- Architecture and the modeling of architectural features with careful lighting and surface treatment. Many of these courses involved API-based programming, with the more advanced courses also including shader programming with Renderman, GLSL, or HLSL. There was general agreement that the context for such a course should be from a real subject, and it was noted that the context might well present an application area where the student might specialize and develop a career path.

A number of issues were raised about these courses, because they involve work outside the technical topics of computer graphics. They include:

- How do you develop a graphics course around an extrinsic context?
- Who chooses the context for the course?
- How do you integrate the context material into the computer graphics course?
- How do you assess whether including a context improves the student’s learning in the course?
- Can we share these among our group and find ways for others to contribute?
- Do some contexts work better than others for this kind of course?
- How much depth in the context area do students need?
- How much detail in the context area should the graphics course provide?
- Are there local experts who can come in to introduce the context?
- Can the instructor collaborate with other disciplines in the context area?
- Is there an institutional focus on an area that can serve as a context?
- How do you assess whether including a context improves the student’s learning in the course?

There was agreement that the context must not overtake the basic goals of teaching computer graphics but rather should augment the goals and generate student and instructor interest.
Follow-up Activities

We realize that our workshop group is significantly smaller than the international computer graphics education world. And, we believe that the issues the workshop raised need to be addressed by much larger groups than ours. So, we agreed that we would develop an online discussion group or wiki, and publicize it in a way that would encourage and inspire others to join the group and contribute ideas and resources such as examples and datasets. A specific goal of this outreach is to enable new people to expand their computer graphics courses to include external contexts. We do not view this outreach as conflicting with other online resources, such as CGEMS or cgSource, that have been developed by SIGGRAPH and Eurographics, because it is never a complete product, but is an organic, evolving, and growing entity that may link educators and resources in a fresh, new way. However, it is our hope that some formal resources will emerge. We also agreed that workshop participants would develop, and would encourage others to develop, articles and papers that could be presented at SIGGRAPH or Eurographics education events. For SIGGRAPH 2009, we plan to develop a BOF from this workshop and will schedule it so as not to conflict with as many major conference activities as would be reasonably possible.

Looking Forward

The discovery of the distinction between these two types of teaching computer graphics was enlightening to the group and led to a lively interchange among the participants. We believe that there are several benefits to the computer graphics community in exploring the nature of teaching different subjects in a computer graphics context. We might learn better what kinds of tools work best for teaching graphics as a means to an end, for example, as well as learning about the particular application needs of various fields. We could also explore the question of developing computer graphics courses that would be service courses for various fields.

The discussion of teaching computer graphics using a context from another field yielded several questions of how the context is used. The discussions among people who taught computer graphics in different contexts led to a need to see more examples, and we look forward to seeing the details of different kinds of courses. The overall goal is to create a richer learning environment by providing experience along with the computer graphics concepts. But perhaps the most intriguing point was the suggestion that computer graphics courses using contexts that touch on real-world problems that affect real people could be an important part of making a computer science program more effective in attracting and retaining women and students from underrepresented groups in the field. We anticipate future work in this direction.

Acknowledgements

The workshop organizers would like to thank Isabel Navazo of the Eurographics Education Board, Rick Barry and Marc Barr of the SIGGRAPH Education Committee, and Rüdiger Westermann of the Technische Universität München, co-chair of the EG09 conference, for their support and assistance, without which this workshop would not have been possible. The workshop also acknowledges the support of the U.S. National Science Foundation through grant CCF-0634837.

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Collaboration and Shared Vocabulary: Game Design & Development
Susan Gold, Full Sail University

As game industry and academic programs continue to evolve, we should move to establish a common vocabulary to enable developers, academics and students to talk to each other with a common understanding of the field. Academic programs can support the industry through educating students with relevant skills and research into new areas of game design and development. In turn, the industry can serve academic programs by supporting academic needs and objectives. Therefore, we should strive to reach common agreement in the following ways:

• A game is an activity with rules. It is a form of play often, but not always, involving conflict, either with other players, with the game system itself, or with randomness/fate/luck.

• Most games have goals, but not all (e.g. The Sims, SimCity). Most games have defined start and end points, but not all (e.g. World of Warcraft, Dungeons & Dragons). Most games involve decision-making on the part of the players, but not all (e.g. Candyland, Chutes & Ladders). A videogame is a game (as defined above) that uses a digital video screen of some kind, in some way.

• The definition above is not meant to exclude any type of game, but is included as a “working definition.” Readers should refer to the referenced books for additional definitions and perspectives on what constitutes a game.

• Studying games involves understanding the many factors that impact the workings of this complex system.

The three overlapping areas in the study of games are:

• Game Design (concerned primarily with interaction and interface design) is the process of crafting a system of play in which players’ actions have meaning in the context of the game environment [Salen and Zimmerman, Rules of Play, 2004]. Game design encompasses the set of principles, concepts, and practices that lead to the development of high-quality games. Implicit in the process of game design is the consideration of design trade-offs to allow the implementation of a game in a playable interactive environment.

• Game Development is concerned primarily with the production of games, especially technologies used in creating a game. Game development is a process that involves the interdisciplinary cooperation of technical disciplines (like software engineering) and creative disciplines (like art and music) to implement a game design in a playable real-world format [Rabin, Introduction to Game Development, 2005]. Game development often involves implementing and incrementally testing potential game elements without knowing in advance which will succeed and which will fail. Game development also requires knowledge of project management to ensure that a game is completed with the available resources and within acceptable time constraints.

• Game Studies is concerned primarily with examining games as cultural artifacts, as pieces of media and exploring theories of play. Game studies deals with the conceptual basis and vocabulary used to study and analyze games. This includes, but is not limited to, the study of game audiences, game history and video-game history, technology / platform history, game criticism, games for educational and instructional purposes.

Readers should refer to the referenced books for additional definitions and perspectives on what constitutes a game.
Where Credit is Due

The following list represents just a few of many dedicated contributors.

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This image mosaic (right) shows some of the many @SIGGRAPH followers on Twitter (Tweeps). Click the mosaic image to go to the live mosaic Web page.

To create your own Twitter Mosaic click here.
This publication was designed for electronic distribution only. Adobe Creative Suite (CS4) was used to create this interactive PDF. The primary typefaces are Melior and Helvetica Neue. The designer was kept refreshed and alert by a healthy supply of Lo-carb Monster Energy.