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ACM is transitioning to an article-based, "online first" content publishing system and all ACM journals are undergoing a similar transition.

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Preface

Welcome to the ACM SIGGRAPH 2015 Technical Papers Program!

The SIGGRAPH Technical Papers program is the premier international forum for disseminating new scholarly research in computer graphics and interactive techniques. As in years past, this year's program features papers that propel the field forward rapidly and vibrantly, while keeping us well grounded academically, ensuring that SIGGRAPH remains a breeding ground for significant new areas of research. In addition to traditional areas such as modeling, rendering, image and video processing, simulation, and character animation, you will find papers in emerging areas such as fabrication, novel display techniques, and virtual reality.

The papers selection process has continued in 2015 much as in recent years, with relatively minor changes to an overall process that has been highly refined over several decades. We continued to use software to reorder paper discussions during the PC meeting so as to reduce the in- and out-flow of conflicted PC members throughout the meeting. This year there were 462 submissions, which is down slightly from 505 submissions in 2014. The papers committee, comprised of 56 experts from academia and industry, accepted 118 papers. The acceptance rate of 25% is in line with the long-term distribution (ranging from 17% to 27% over the last decade). Another 6 papers were referred to ACM Transactions on Graphics (TOG) as "Accept with major revision." It has been both humbling and inspiring to witness the tremendous amount of work that goes into selecting the highest quality papers for SIGGRAPH.

The Technical Papers program at the conference also includes presentations for 36 papers published in regular issues of the TOG journal during the last year. As in recent years, the SIGGRAPH- and TOG-accepted papers are merged into common sessions to increase cohesiveness. This year the 154 total (118+36) papers presented at the conference was down from the all time high of 173 total (127+46) papers in 2014. This reduction allowed us to increase the presentation times back to 18 minutes (plus 3 minutes for questions and transitions) from 15 minutes in 2014, and convert many 5-paper sessions back into ones with 4 papers per session.

This year saw a number of SIGGRAPH administrative changes that affected the papers program. In previous years, the papers chair usually worked with administrative assistants at Talley Management Group, Inc., but this year it abruptly changed to Meeting Expectations!, and then shortly after the papers committee meeting it changed once again to SmithBucklin. I want to thank everyone involved, and especially Patrick Merkel, for helping make these transitions relatively painless to me as the papers chair, and transparent to the graphics community.

I am grateful to the many people that made the Technical Papers Program for SIGGRAPH 2015 possible:

- All the authors for submitting such great papers!
- Marc Barr, SIGGRAPH 2015 Conference Chair, for his support and leadership;
- Adam Finkelstein, SIGGRAPH 2014 Technical Papers Chair, for showing me the ropes, and providing excellent advice and support throughout the process. In addition, Adam volunteered to provide invaluable technical support for the Hepcat PC Meeting App that we again used to further improve and streamline the PC meeting;
- My advisory board (Michael Cohen, Adam Finkelstein, Tom Funkhouser, Eitan Grinspun, John Hughes, Steve Marschner, Michiel van de Panne, Holly Rushmeier, and John Snyder) for providing prompt advice on important issues despite their busy schedules;
- My sort committee (Michael Cohen, Tom Funkhouser, Eitan Grinspun, John Hughes, Steve Marschner, Michiel van de Panne, Sylvain Paris, and John Snyder) for spending a weekend in Ithaca assigning papers to committee members;
- The 56 members of the Papers Committee, for the enormous effort they put into making the review process a success;
- All the other reviewers for their thoughtful paper reviews, and for participating in the online discussions;
- Patrick Merkel, Mike Jones, and others at "Meeting Expectations!" for their excellent assistance and administrative support throughout the majority of the process;
- Leona Caffey, Cindy Stark and Imran Abbasi from SmithBucklin for helping identify the PC meeting venue, providing administrative support (especially in the latter half of the process), and helping make the PC meeting run so smoothly;
- The people at Eaglewood Resort for providing a good venue for the PC meeting;

Preface

- Jim Kilmer and Jeff Ballinger of the Opal Group for responsiveness and support for the SIS review system;
- Dan Goldman and Tom Buehler for creating the Video Trailer for the Papers Program;
- Kavita Bala, the new Editor in Chief of TOG, for smoothly managing the relationship between TOG and SIGGRAPH papers, as well as serving on the Papers Committee;
- At Cornell University, I want to acknowledge Steve Marschner and Kavita Bala for not only being the best office neighbors one could ask for, but for also being—very conveniently—future/former SIGGRAPH Asia papers chairs who helped me with many questions and discussions;
- Randy Hess for administrative support at Cornell;
- Fred Schneider, David Gries and Ken Birman at Cornell for being patient while I was busy with other SIGGRAPH duties, and all of my Cornell colleagues for their understanding as I also transitioned to Stanford;
- The Papers Advisory Group for providing guidance on long-term issues affecting the papers program;
- Stephen Spencer for assembling the proceedings;
- Greg Turk for encouraging me to continue the long-standing tradition of selecting “cover images,” which disappeared briefly last year when the proceedings first became virtual and were no longer printed in book form;
- Tom Rieke and the team at Q Ltd. for managing the conference web pages;
- Maciej Halber for creating the 3D model of the SIGGRAPH Technical Papers scepter which has been 3D printed, and will be passed on between papers chairs for many years to come;
- Benny Garcia for overseeing and compiling the Fast Forward Session, and being receptive to switching to full HD video submissions to improve quality and audiovisual synchrony of the presentations;
- Adobe Research for providing financial support for the Technical Papers Program; and
- Finally I want to thank my students and family (Karen and Ethan) for their understanding and support during the busy times that I served as Technical Papers Chair.

For SIGGRAPH 2016, the job of Technical Papers Chair will be in the very capable hands of John Snyder. Please work with John and the rest of your graphics colleagues to help make next year’s papers program another great success!

Doug James, Stanford University (as of June 1, 2015)
Technical Papers Chair, SIGGRAPH 2015

2015 ACM SIGGRAPH Awards

Significant New Researcher Award

Johannes Kopf



ACM SIGGRAPH is delighted to present the 2015 Significant New Researcher Award to Johannes Kopf in recognition of his pioneering contributions to the fields of digital imaging and video, particularly his work on hyperlapse generation, image completion, gigapixel panorama viewing, and image upsampling and downsampling.

Johannes' problem selection is especially creative and often far afield from other efforts in the area. In his 2014 paper on "First-Person Hyperlapse Videos" he brought together technologies from both computer vision and computer graphics. The method was able to successfully convert long-duration sequences from a wearable camera into stable, fast paced, and surprisingly watchable video. His 2011 paper "Depixelizing Pixel Art" showed how to convert low-resolution bitmap art into smooth, high-resolution graphics. A related 2013 paper "Content-Adaptive Image Downscaling" solved the opposite problem, converting high-resolution 2D art into low-resolution bitmaps that were much clearer and crisper than traditional image downsampling. His 2007 papers on "Capturing and Viewing Gigapixel Imaging" and "Joint Bilateral Upsampling" showed how to construct and view large wide angle images, and demonstrated the use of bilateral filters to upsample low-resolution solutions to full scale images in several imaging domains; this algorithm continues to be widely used. In 2010, his paper "Street Slide: Browsing Street Level Imagery" showed how to construct on-the-fly multi-perspective panoramas from street level imagery.

Johannes joined Microsoft Research in 2008 after completing his PhD at the University of Konstanz; he previously completed a B.Sc and M.S. degrees from the University of Hamburg. He has served on numerous program committees for SIGGRAPH and SIGGRAPH Asia. Johannes also received the Eurographics Young Researcher award in 2013.

We are pleased to recognize Johannes' creative research with the 2015 Significant New Researcher Award.

Previous Award Recipients

2014 Noah Snively
2013 Niloy J. Mitra
2012 Karen Liu
2011 Olga Sorkine
2010 Alexei Efros
2009 Wojciech Matusik
2008 Maneesh Agrawala
2007 Ravi Ramamoorthi
2006 Takeo Igarashi
2005 Ron Fedkiw
2004 Zoran Popović
2003 Mathieu Desbrun
2002 Steven J. Gortler
2001 Paul Debevec

2015 ACM SIGGRAPH Awards

Computer Graphics Achievement Award

Steve Marschner



ACM SIGGRAPH presents the Computer Graphics Achievement Award to Steve Marschner for his work on modeling the appearance of natural materials.

Steve's research has produced the most realistic appearance models to date of many real-world materials --- the highlights off blond hair, the glow of a baby's skin, the glints off metals, the glitter of paint, the gloss of polished wood, the stretch and motion of a knitted sweater, and the sheen of silk.

Steve's research combines three critical ingredients: detailed models of the intricate structure of materials, physically-based simulation of how light interacts with structured materials, and measurement of materials to capture and validate their appearance.

Steve's seminal work in 2003 on hair showed that modeling scattering from the structured surface of hair strands is necessary to correctly predict the multiple distinctive highlights in hair. In 2001, Steve's work on subsurface scattering simulated phenomena such as the glow of translucent materials like skin, marble, and milk.

Steve has pioneered the measurement techniques used in realistic material acquisition. His recent work on representing the detailed structure of fabrics has enabled the most realistic visual appearance rendering and motion simulation of fabrics to date. He has also turned the problem around to fabricate translucent materials using pigments.

Steve Marschner's work has had a deep and profound impact in applications from the entertainment industry to industrial design, and has fundamentally changed how materials like hair, skin, wood, marble, and fabric, are modeled, measured, and rendered in graphics.

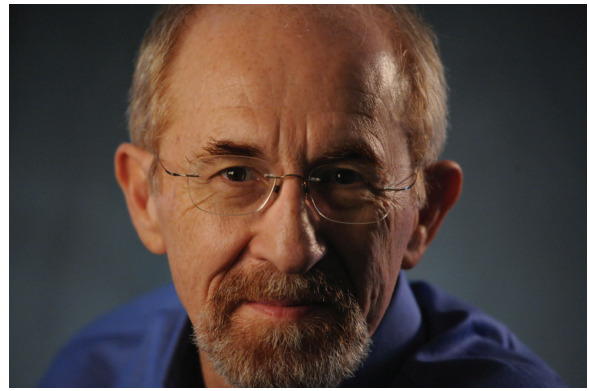
SIGGRAPH is pleased to recognize Steve Marschner's outstanding contributions to computer graphics.

Previous Award Recipients

2014 Thomas Funkhouser	1997 Przemyslaw Prusinkiewicz
2013 Holly Rushmeier	1996 Marc Levoy
2012 Greg Turk	1995 Kurt Akeley
2011 Richard Szeliski	1994 Kenneth E. Torrance
2010 Jessica K. Hodgins	1993 Pat Hanrahan
2009 Michael Kass	1992 Henry Fuchs
2008 Ken Perlin	1991 James T. Kajiya
2007 Greg Ward	1990 Richard Shoup and Alvy Ray Smith
2006 Thomas W. Sederberg	1989 John Warnock
2005 Jos Stam	1988 Alan H. Barr
2004 Hugues Hoppe	1987 Robert Cook
2003 Peter Schröder	1986 Turner Whitted
2002 David Kirk	1985 Loren Carpenter
2001 Andrew Witkin	1984 James H. Clark
2000 David H. Salesin	1983 James F. Blinn
1999 Tony DeRose	
1998 Michael F. Cohen	

2015 ACM SIGGRAPH Awards

Steven Anson Coons Award for Outstanding Creative Contributions to Computer Graphics



Henry Fuchs

ACM SIGGRAPH is pleased to award the 2015 Steven Anson Coons Award for Outstanding Creative Contributions to Computer Graphics to Henry Fuchs for his contributions in augmented and virtual reality, telepresence and graphics hardware, and his lifetime of contributions in leading and educating the leaders in the field of computer graphics.

In his earliest work, Henry described one of the first 3D digitizing technologies, and went on to contribute much of the foundational work on visibility computation. From there, he developed some of the earliest specialized hardware for computer graphics. The multiple Pixel-Planes and Pixel Flow systems developed at UNC introduced novel architecture and algorithms, influencing the evolution of graphics hardware and systems for interactive graphics that is now ubiquitous today.

Henry has made significant contributions to augmented reality, particularly in the areas of video see-through displays, and wide area tracking. Many of these advances have been motivated by applications in medicine; informative visualizations during surgery or exams, and telecollaboration. During a panel in SIGGRAPH 2014 he discussed the historical development of wearable displays including many pioneering contributions from his laboratory. His 1998 SIGGRAPH Paper, “The Office of the Future: A Unified Approach to Image-Based Modeling and Spatially Immersive Displays”, was unique in that it not only defined components of a system, but laid out a vision of how telecollaboration might evolve.

Henry’s contributions to SIGGRAPH extend well beyond his own research. In his 40 years in academia, he has educated and graduated many of the most recognized and accomplished leaders in the field of computer graphics.

Henry earned his PhD from the University of Utah in 1975 and spent three years at the University of Texas as an assistant professor before joining the University of North Carolina at Chapel Hill in 1978, where he is currently the Federico Gill Distinguished professor of Computer Science. He is the recipient of the 1992 ACM SIGGRAPH Achievement Award, became an ACM Fellow in 1994 and received the 2013 IEEE-VGTC Virtual Reality Career Award.

Previous Award Recipients

2013 Turner Whitted
2011 James T. Kajiya
2009 Robert L. Cook
2007 Nelson Max
2005 Tomoyuki Nishita
2003 Pat Hanrahan
2001 Lance J. Williams
1999 James F. Blinn
1997 James Foley
1995 José Luis Encarnação
1993 Ed Catmull
1991 Andries van Dam
1989 David C. Evans
1987 Donald P. Greenberg
1985 Pierre Bézier
1983 Ivan E. Sutherland

2015 ACM SIGGRAPH Awards

Lifetime Achievement Award in Digital Art

Lillian Schwartz



Photo of Lillian F. Schwartz taken by unknown photographer at Bell Telephone Laboratories, Murray Hill, New Jersey.

The 2015 ACM SIGGRAPH Lifetime Achievement Award in Digital Art is awarded to Lillian Schwartz who is best known for her pioneering work in the use of computers in art including graphics, film, video, animation, special effects, virtual reality and multimedia and computer-aided analysis of art and architecture.

Schwartz began her computer art career as an offshoot of her merger of art and technology. This culminated in the selection of her kinetic sculpture, *Proxima Centauri*, by The Museum of Modern Art for its epoch-making 1968 *Machine* Exhibition. Her work was recognised for its aesthetic success and was the first in this medium to be acquired by The Museum of Modern Art.

Her very early pioneering work in computer art took place in the 1970's at AT&T Bell Laboratories, IBM's Thomas J. Watson Research Laboratory and at Lucent Technologies Bell Labs Innovations, where she worked in a team of important creative researchers. Here she developed effective techniques of motion-graphics-based film and video art that could be viewed in both 2D and 3D.

Through her ground-breaking work, Schwartz helped to establish computer art as a viable field of endeavour. Additionally she contributed to scientific research areas such as visual and colour perception, and sound. Her own personal efforts have led to the use of the computer in the philosophy of art and had an impact on the History of Art. She devised databases to analyse the choices of artists such as Picasso and Matisse regarding color palettes, structures of paintings, sculptures and graphics used, thus investigating the creative process itself.

Schwartz's contributions to electronic art analysis, and restoration, have been recognized specifically in relation to Italian Renaissance painting and fresco, working with colleagues to construct 3-D models. This includes the Refectory at Santa Maria Grazie to study the perspective construction of Leonardo's Last Supper and, more

recently, a finite element model of the Leaning Tower of Pisa to understand its structure and aid in its preservation. Such efforts have proved invaluable to Art Historians and Restorers.

Schwartz's education began immediately after World War II when she studied Chinese brushwork with Tshiro in Japan and later Fine Art in USA. But she always had a keen interest in the combination of art with technology and science. However, although fascinated with the technological aspects of the computer as a new approach to creating art, Schwartz was most concerned with the finished product -the permanent work of art. In her early computer works therefore, due to the technological limitations of early programs, she enhanced her work with more traditional materials, including silkscreen and film. In time, the technology advanced to the degree that her digital computer works could be viewed in their finished state on a high quality monitor and printed out with the intensity and nuances of colour desired. She continues to experiment and to push the medium to achieve the results for which she is striving.

Schwartz has always had close ties to the academic community, having been a visiting academic at a number of leading Universities throughout the world. She has represented the United States as guest lecturer in over two dozen countries, from the Royal College of Art in London to the People's Republic of China. Schwartz has had numerous fellowships and honours conferred upon her. Most recently she received Computerworld Smithsonian Awards in three categories. Her work has been in great demand internationally for museums and festivals. For example, she has exhibited and won awards at the Venice Biennale, Zagreb, Cannes, The National Academy of Television Arts and Sciences, and nominated and received Emmy nominations and an award in the 1980s. Her work has been exhibited throughout the world and is held in both private and public collections. Her 1992 book [The Computer Artists Handbook](#), influenced the subsequent generation of computer artists. She has been the subject of numerous articles, books and television news

and documentary programs. She is a Fellow in The World Academy of Art & Science.

ACM SIGGRAPH is honored to recognize Lillian Schwartz, as an important pioneer in the incubation and practice of computer and digital arts, art analysis and the field of virtual reality.

Previous Award Recipients

2014 Harold Cohen
2013 Manfred Mohr
2012 Jean Pierre Hébert
2011 Charles Csuri
2010 Yoichiro Kawaguchi
2009 Lynn Hershman Leeson and Roman Verostko

2015 ACM SIGGRAPH Awards

Outstanding Service Award

Mike Bailey

For his leadership, expertise, and dedication, ACM SIGGRAPH recognizes Mike Bailey for his commitment to our community with the 2015 Outstanding Service Award.

Mike began his long association with the ACM SIGGRAPH Conference Courses program by participating on the conference Courses Committee in 1983 and being the conference Courses Chair for SIGGRAPH 1984. He followed with four more years of leadership as conference Courses Chair in 1985, 1987, 1988, and 1994. During those years, computer graphics was relatively new and growing rapidly. Mike's dedication to expanded topics and excellence helped make the SIGGRAPH conference courses program the premier venue for learning the latest techniques. Thousands learned basic and advanced techniques and contributed to the eventual result that computer graphics became pervasive and economically viable.

Continuing SIGGRAPH's education mission, Mike was the first face many newcomers to our community saw in his role as an instructor for the "Fundamentals Seminar" and the "Introduction to Computer Graphics" course. All told, Mike has presented the Fundamentals Seminar 18 times and has been a course speaker at SIGGRAPH North America 24 times and SIGGRAPH Asia six times. Mike's presentations and lectures have been the foundation for many attendees learning about computer graphics the 'right' way (that is, the fun way).

In addition to his leadership role in education, Mike also served on the ACM SIGGRAPH Executive Committee (1986-1990) and served as SIGGRAPH Conference Co-Chair in 1991. He helped guide the organization and the conference as a member of its Book Series Editorial Board from 1994 to 1998 and as Editor of the SIGGRAPH Technical Slide Set from 1998 to 2000. He is also a longtime member of the ACM SIGGRAPH Education Committee and a two-time conference Education Chair.



With this award, ACM SIGGRAPH shows its pride in Mike Bailey and recognizes his broad contributions to the organization, its conferences, and its commitment to education.

Biographical Sketch

Mike Bailey is a Professor of Computer Science at Oregon State University. His research interests include scientific visualization, GPU shader programming, and parallel programming.

Mike received his PhD from Purdue University. He has since worked at Sandia National Laboratories, Purdue University, Megatek Corporation, the San Diego Supercomputer Center, and Oregon State University.

Mike enjoys teaching and has taught a variety of classes to over 5,500 college students, winning 11 university teaching awards in the process. He has graduated 44 Masters and PhD students. He has taught in a total of 48 SIGGRAPH courses, plus another 41 in less-awesome conferences and workshops. :-)

Previous Award Recipients

2014 Scott Lang
2013 Mary Whitton
2012 David J. Kasik
2010 Kellogg S. Booth
2008 Stephen Spencer
2006 John Fujii
2004 Judy Brown and Steve Cunningham
2002 Bertram Herzog
2000 Tom DeFanti and Copper Giloth
1998 Maxine Brown