



Games, Entertainment, and Media for Life, Health, and Community

IEEE GEM 2014.

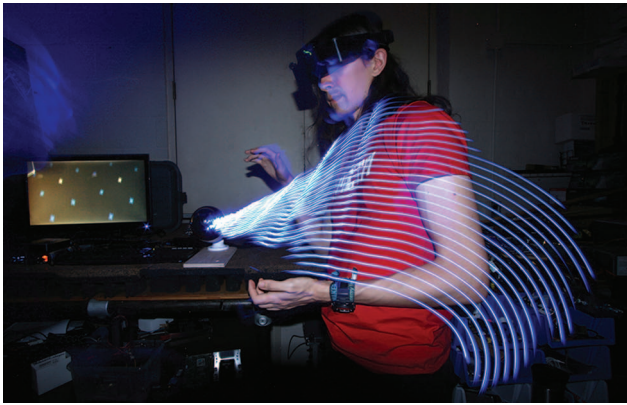
By Nahum Gershon, Bill Kapralos, and Steve Mann

IF YOU ENTERED THE ROOM WHERE THE 2014 IEEE Games, Entertainment, and Media Conference (IEEE GEM 2014) was held, you would have thought that you were experiencing one of the imaginary worlds depicted in many good science fiction stories. The audience witnessed the current and future technologies that could and will be used in future games, entertainment, and media. In addition to being seriously technical, the participants were playful, enjoying their technology. IEEE GEM 2014 was held at the University of Toronto, Canada, 22–24 October 2014.

KEYNOTE SPEAKERS

The first keynote address at IEEE GEM 2014 was given by Dr. Steve Mann, a professor at the University of Toronto, recognized as “the father of wearable computing” [2000 IEEE International Solid-State Circuits Conference (ISSCC)] (a crazy idea...35 years ago...Now

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Alex Peake tries out the Surveilluminescent wand invented by Steve Mann.



Beth Veinott and her daughter participate in a hands-on experience with Steve Mann.



During his keynote speech, Mann used hand gestures to control his computer.

a US\$241 billion industry!) and also the inventor of the high dynamic range imaging that is used in many mobile phones today and the inventor of the Eye Tap Digital Eye Glass in 1985. Mann gave the keynote presentation “Augmediated Reality Gaming” and, practicing what he preached, used hand gestures to control his computer during his talk.

Mann brought together many of the different ideas and talks under a unified framework, “fieldary user interfaces,” building on Gershon’s concept of human information interaction [1]. Mann surveyed many interfaces and interaction devices that could be used in gaming as well as to enrich life experiences and to overcome disabilities while contextualizing them in terms of fieldary user interfaces [2]. He described, for

Streamframe is leveraging the technology platform developed by Streamline to help game developers and creative agencies with distributed productions.



Elena Bertozzi and Nitin Guleria experimenting with an Integral Kenesiology (Integral Kinematics) exercise system.



Ryan Janzen experimenting with a wobble board and stability measuring device.

example, integral kinesiology, a new approach to fitness and gaming control based on time integrals of displacement rather than distance and its derivatives. Traditional kinematics only considers speed, acceleration, etc., i.e., distance and its derivatives, which are commonly used in fitness, gaming, sports, and the like, and is thus, in some sense, only a “half truth.” Now we’re looking at integral kinematics (distance and its derivatives and also its time integrals). A destabilizing bar suspended from a ceiling and a wobble board on the floor (that incorporated consumer electronics devices) were used to illustrate these concepts and their applications in “a variety of fitness tasks and games to create a fun and playful yet effective fitness training program.” The audience extensively experimented with these devices during the breaks.

The internationally acclaimed Guggenheim awardee Federico Solmi was the second keynote speaker at the conference. The Bologna-born, Brooklyn-based artist uses game engines to produce intricately textured and detailed 3-D videos, which combine biting political satire with multilayered observations of the contradictions of modern life. He described his art and how the combination of traditional art, video, and video games could produce tantalizing and effective pieces of art. Solmi’s artwork was also displayed in a special area at the conference, the GEM gallery, and provided the background for the IEEE GEM 2014 Web site (ardeaarts.org/ieeeGem/ieeeGem14/index.html).

The third keynote speaker was Alexander F. Fernandez, chief executive officer of Streamline Media Group and Streamline Studios. Fernandez is an accomplished entrepreneur whose experience at the global crossroads of media, entertainment, and technology has given him a unique perspective on the development of video games and their uses in nongaming applications. He built his first start-up, Streamline, into a global leader in content outsourcing for AAA video games that has completed more than 150 productions, including *Bioshock Infinite*, *Gears of War*, and James Cameron’s *Avatar*. His second start-up, Streamframe, is leveraging the technology platform developed by Streamline to help game developers and creative agencies with distributed productions. He will be providing industry perspectives on where games are going.



Alexander Fernandez.

In his talk, “Industry Perspectives,” Fernandez discussed the recent history of the game industry and how one consumer electronics device, the mobile phone, has been a game changer. It has revolutionized the way games are created, funded, produced, distributed, and used.



Federico Solmi.

One of the creations of Federico Solmi. (Image courtesy of Federico Solmi.)



The fourth keynote speaker was Ron Baecker, a world-renowned expert in human-computer interaction and user interface design. Baecker is an emeritus professor of computer science, Emeritus Bell Chair in human-computer interaction at the University of Toronto, cofounder of the Dynamic Graphics Project, founder of the Knowledge Media Design Institute, and founder and director of the Technologies for Aging Gracefully Lab at the University of Toronto. His research expertise includes electronic memory aids and other cognitive prostheses; computer applications in education; computer-supported cooperative learning, multimedia, and new media; computer animation and interactive computer graphics; and computer literacy and how computers can help



Ron Baecker.

us work better and safer. Baecker is one of the “60 Pioneers in Computer Graphics” awarded by the Association for Computing and Machinery Special Interest Group on Computer Graphics and Interactive Techniques.

Baecker discussed the importance of information and communication technologies (e.g., the Internet, mobile phones, and tablets) for older adults, within a comprehensive framework



Bruce Ballon.

that considers social, cultural, economic, psychological, and physiological dimensions. He pointed out that “specific roles for new technology may be understood in terms of the Maslow Hierarchy of Human Needs: biological or physiological needs, safety needs, love or social needs, esteem needs, and the need for self-actualization—a sense of a calling or cause.” Despite the growing use of the Internet, the Web, and mobile phones among older adults, we have barely scratched the surface of what is possible. The bulk of the presentation addressed “landmark achievements that meet specific needs, promising approaches, and open problems in the design of technology to

help older adults age gracefully.” Particular attention was paid to the role of games.

The fifth and final keynote speaker was Bruce Ballon. An award-winning psychiatrist, Ballon brings two decades of experience in providing innovative education, novel simulations, psychodynamic coaching, group facilitation, and creativity-enhancing techniques for teaching and training individuals and groups. He is the director of education for the Ontario Simulation Network, a not-for-profit organization that connects the simulation community, facilities, resources, and services across the

Province of Ontario, Canada. Ballon is a professor at the University of Toronto (Department of Psychiatry), and he is also the director of the Psychiatry Simulation Innovation Centre for the University of Toronto based at Mount Sinai Hospital in Toronto, which specializes in simulations to assist understanding alternative points of view and enhancing communication.

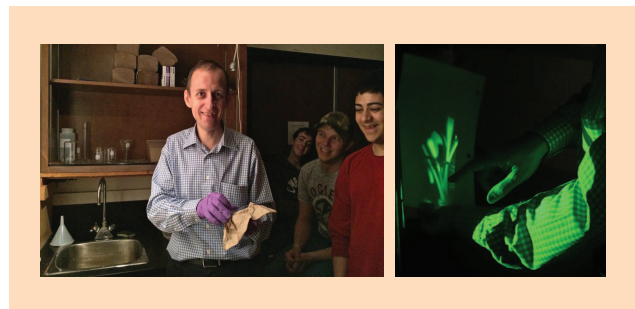
In his talk, “Cyberworld Impact on the Human Condition,” Ballon discussed how raising awareness of the virtual and “real” world intersections could result in influencing individuals, the community, and culture and how “games can transmit values and prime players into thinking in specific ways and developing conditioned behaviors.” He then described considerations for creating healthy relationships with cybertechnology and advised the audience to use it wisely since it is here to stay.



The topics covered included the importance of instructional design, managing an interdisciplinary development team, and current consumer-level technologies and the new opportunities they provide, and games for health developers.



Bill Kapralos (left) and Bruce Ballon.



Emanuel Istrate, chair, IEEE Toronto Section, gets his hands wet while conducting a demo of the recording of 3-D models.



One of the many selfies generated during the conference, this time of Dana Popa, Ross Smith, and Nahum Gershon.

RESEARCH PAPERS

The research papers consisted of many sessions that covered a wide range of topics. They were categorized roughly into sessions on human factors, interaction, and game user research (such as “Examining the Effects of Visual and Cognitive Fidelity”); games in education; serious games and exergaming (such as “Design Lessons from Mainstream Motion-Based Games for Exergames for Older Adults”) to game design (such as “Balancing Multiplayer First-Person Shooter Games”); technology and algorithms (such as “Audio Games as Educational Tools: Design Principles and Examples”); and games studies, psychology, and sociology in games (such as “Understanding Player Perception of Accumulated Context”).

A complete listing of the proceedings and the individual papers can be found on IEEE *Xplore*. A PDF of the conference program is posted on the IEEE GEM 2014 Web site at <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7047966>.

TUTORIALS AND WORKSHOPS

On the first day, IEEE GEM 2014 conducted three tutorials and a workshop. The tutorials covered diverse topics including:

- ▼ “Holography and the Recording of 3-D Models” by Emanuel Istrate (University of Toronto)
- ▼ “Design and Customize Your Own Location-Based Game” by Kai Erenli
- ▼ “HTML5 Game Development” by Jim Parker (University of Calgary).

The workshop “Introduction to Enterprise Gamification” was given by Ross Smith and Dana Popa.

Face-to-face encounters have unique advantages that cannot be easily replicated by online technology.

PANELS

Two panels at IEEE GEM 2014 brought together leading experts and researchers to discuss important topics relevant to the IEEE GEM community. The first panel, “Funding Opportunities,” included panelists Eugene Fiume, a professor in the Department of Computer Science at the University of Toronto, and Elena Bertozzi, an associate professor in game design and development at Quinnipiac University. The panel took place on Thursday, 23 October, and covered information about available funding for research and development as well as advice on how to increase the prospects of getting funded.

The second panel, “The Use of Games and Simulation for Health and Health Professions Education,” brought together an international group of experts in the use of games and game-based technologies for health care, health management, and health professions education to discuss the benefits, problems, limitations, and growing opportunities within the field of games for health and health professions education. Topics covered included the importance of instructional design, managing an interdisciplinary development team, and current consumer-level technologies and the new opportunities they provide to “games for health developers.” The panelists also shared their own personal experiences within this domain and offered their views of future opportunities. The panelists included Bruce Ballon, Bill Kapralos, Roy Eagleson (University of Western Ontario, London, Canada), Sandrinbe de Ribaupierre (University of Western Ontario), Alvaro J. Uribe (Military University Nueva Granada, Bogota, Colombia), and Byron A.P. Gutierrez (Military University Nueva Granada).



Jim Parker in attendance at the conference.

BROADENING THE CONCEPT OF THE CONFERENCE

The IEEE GEM community has taken the task of broadening the concept of the conference and bringing it to the realities of the 21st century. We realize that, like media, each conference format or technology has its own strengths and weaknesses. Face-to-face (F2F) encounters have unique advantages that cannot be easily replicated by online technology. This is why we continue to invest considerable resources in organizing F2F conferences. The speakers are



Eugene Fiume at the conference.

there, the participants are there, and so are the potentially strong interactions and outcomes.

However, we can assist these F2F meetings with the available technology, especially consumer technology. Gone are the days when each participant had a computer with him or her during the conference. Many now use their mobile devices such as tablets and smartphones. This is why we have made a special effort to publish the proceedings on the cloud rather than on a USB stick. This requires that each CE Society conference provide a Wi-Fi connection to all participants during the whole length of the conference. It is not always easy to get it, but we are of the opinion that it is worth the effort.



The IEEE GEM community has a Facebook page where attendees are encouraged to participate before, during, and after the conference.

The same applies to social media. The IEEE GEM community has a Facebook page where attendees are encouraged to participate before, during, and after the conference. In future conferences, participants will be encouraged to publish Tweets during the conference with a hashtag corresponding to the particular conference session they are attending. This way, members of the community and others will have access to some of the technical material and experiences of the conference.

We realize that the technical content of a conference is not the whole story. In a game-focused conference, it is appropriate for the participants to practice what they preach and test and experience first hand the technology that they and others are developing. This will help develop a fuller understanding of its potential advantages and pitfalls.

In a conference on health, for example, it might be appropriate to include some public activities that promote health, such as an exercise session in public before some talks. We experimented with this concept at the Sydney eHealthcare Workshop in December 2014 and at the 2015 International Conference on Consumer Electronics in Las Vegas in January. The results were quite encouraging.

BRINGING DISPARATE SOCIETY ACTIVITIES TOGETHER

The IEEE GEM community has also worked to bring together activities of the IEEE CE Society that are traditionally disparate for the benefit of the Society and its members. The conference was conducted, for example, with tight coordination with the IEEE Toronto Section and the Toronto Chapter of IEEE CE Society. In the coming year, IEEE GEM 2015 plans to hold an

IEEE CE Society Toronto Chapter meeting and Distinguished Lecturer presentations for the local Chapter around the time of the conference, just to mention a few Society activities. As with IEEE GEM 2014, the 2015 IEEE GEM conference will be coordinated together with the IEEE Toronto Section.

CONFERENCE LEADERSHIP

The conference chair was Bill Kapralos (University of Ontario Institute of Technology), the conference cochair was Nahum Gershon (The MITRE Corporation), the program chair was Elena Bertozzi (Quinnipiac University), and the tutorial chair was Jim Parker (University of Calgary). The Program Committee consisted of more than 30 well-known international experts in games, entertainment, and media. The administration was skillfully orchestrated by Charlotte Kobert.

ABOUT THE AUTHORS

Nahum Gershon (schmooz@mac.com) is a senior principal scientist at The MITRE Corporation. His current interests include people, communities, playfulness and games, visualization, storytelling, the Internet of Things, and social media. He is right- and left-brain enabled. (The author's affiliation with the MITRE Corporation is provided for identification purposes only and is not intended to convey or imply MITRE's concurrence with, or support for, the positions, opinions, or viewpoints expressed by the author.)

Bill Kapralos (bill.kapralos@uoit.ca) is an associate professor in the Game Development and Entrepreneurship Program at the University of Ontario Institute of Technology. His current research interests include serious games, real-time acoustical modeling, and three-dimensional (spatial) sound generation for virtual environments and video games, multi-modal virtual environments/reality, and the perception of auditory events.

Steve Mann (mann@eyetap.org) is widely regarded as “The Father of Wearable Computing” (IEEE ISSCC 2000). His work as an artist, scientist, designer, and inventor made Toronto the world's epicenter of wearable technologies in the 1980s, and it remains so to the present day. In 1992, he founded the Massachusetts Institute of Technology Media Lab's Wearable Computing Project, and in 1998, he invented the smartwatch videophone (wearable computer). Some of his other inventions include high dynamic range imaging, now used in nearly every commercially manufactured camera, and the EyeTap Digital Eye Glass, which predates the Google Glass by 30 years. He is currently the chief scientist at Meta, a California-based start-up.

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- [2] S. Mann. (2014, Oct.). SELF-HII: Strength+ endurance+ longevity through gameplay with humanistic intelligence by Fieldary Human Information Interaction, in *Proc. IEEE Games, Entertainment, and Media Conf. (GEM)*, pp. 1–8. [Online]. Available: <http://wearcam.org/fieldary.pdf>

