



THE POINT OF KNOWING

Sony Computer Science Laboratories, Inc.
First Symposium in the United States

Sony CSL

The Point of Knowing

Sony CSL and the Art of Now-how

Each one of us is always on the point of knowing something new. But what is the point of knowing anything in the first place? Sony CSL's mission is to keep exploring and sharing better ways to deal with the increasingly complex challenges and unique, unpredictable circumstances confronting individuals and the entire human race. We never know what "now" will hit us next, but Sony CSL is working on science and technology that can optimize our "now-how" ability to cope.

Sony CSL Milestones

Mario Tokoro establishes
Sony CSL in Tokyo

Luc Steels opens
the Paris branch

25th
Anniversary

First US
Symposium



Sony CSL

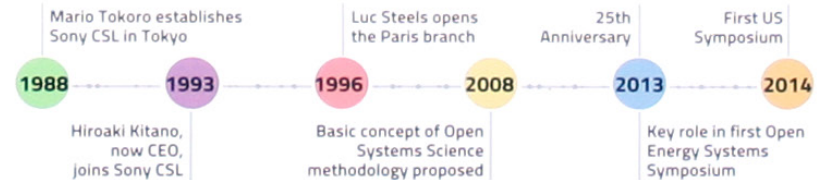
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Sony CSL and the Art of Now-how

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Sony CSL Milestones



Sony CSL research achievements

- Aperios operating system. Applied in robot dog AIBO; later adapted for use in PlayStation 3.
- FEEL user interface. Now part of the international standard for near-field communication.
- Groundbreaking work in Distributed-AI, Augmented Reality, Visual Computing, Systems Biology, Econophysics, Factory Efficiency, Interactive Music, Semiotic Dynamics, Open Systems Dependability — and many other domains.

Notes



SONY



Sony CSL

THE POINT OF KNOWING

Sony Computer Science Laboratories, Inc.
First Symposium in the United States

September 22, 2014, The Museum of Modern Art, NY.

Symposium: 3 p.m. - 6:30 p.m.
Theater 2, B1F

Part I: 3 p.m. - 4:30 p.m.

Opening
"Think Extreme"
Hiroaki Kitano

"Open Energy Systems - A Peer-to-peer
Electricity Grid"
Annette Werth

"Synecoculture - Human Augmentation of
Ecosystems"
Masatoshi Funabashi

"Habitable Bits - Interactive Cities of the
Future"
Yuichiro Takeuchi

Part II: 4:45 p.m. - 6:30 p.m.

"The First 25 Years of Sony CSL and
Open Systems Science"
Mario Tokoro & Adam Fulford

"A New You - Dawn of the Augmented Human"
Jun Rekimoto

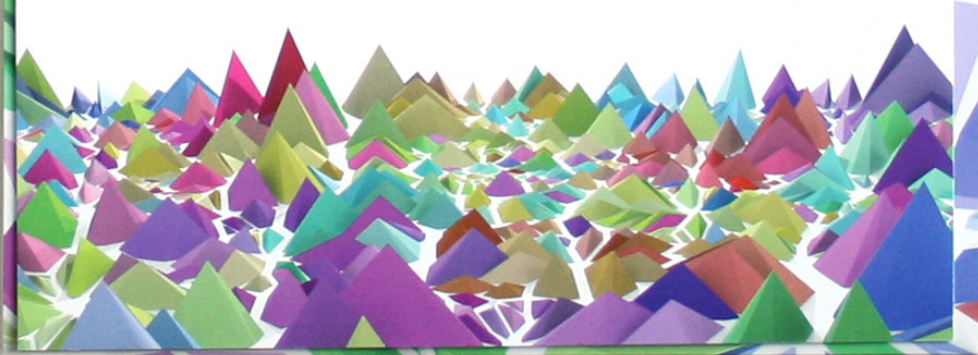
"Hack the Body - Prosthesis as Augmentation
Technology"
Ken Endo

"The Way of Play - Interactive Aesthetics"
Alexis André

"Style Cryogenics - The Future of Music Assets?"
François Pachet

Break

Reception: 6:30 p.m. - 7:30 p.m.
The Ronald S. and Jo Carole Lauder Lobby, 1F



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Facilitators



Yoko Honjo



Yoko Honjo has spent her entire career with Sony, working first with Sony Corporation and more recently with Sony CSL. She is currently in charge of communications, where she serves as General Manager.



Adam Fulford

Adam Fulford led the team that produced the booklet *The Point of Knowing* to mark Sony CSL's 25th anniversary in 2013. Born in England, he has been in Japan since 1981 and runs a language services company that works mainly with Japan's public broadcaster, NHK.

Contact

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TPoK@csl.sony.co.jp

Alexis André

Born in France, Alexis André has been living in Japan since 2002. After earning an Engineering Degree from Supélec, he obtained an ME and PhD from the Tokyo Institute of Technology. His research interests cover computer-generated/-assisted art, procedural design, computer graphics, HCI, computer vision, game psychology and game design.



I believe coming generations of digital natives will seek entertainment that offers more interaction and personalization, from music to games. I want each creator to fundamentally influence, and be amazed by, whatever he or she interacts with. At Sony CSL I can enjoy the immense value of applying knowledge from diverse realms. As well as having freedom to think, I am free to approach partners to work with.



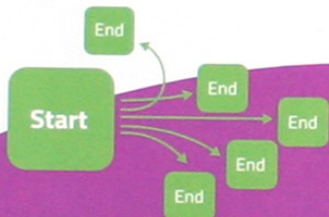
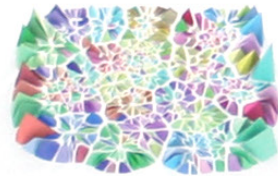
The Way of Play.



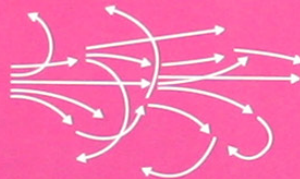
Interactive Aesthetics

Alexis André studies ways in which new digital media allow for unprecedented creative exploration. His work builds on the idea of process as art, with the creator focusing on interaction with the process. His talk will include a specific example of the extent to which sound can be played with.

The aim of Interactive Aesthetics is to deliver the next generation of entertainment through personalized, tweakable creativity.



Just because you start in a certain place doesn't mean you will wind up in a specific destination. One key to freedom is an interactive experience of the creative process.



In a "Way of Play" approach, emphasis is on the process rather than the outcome. What might happen in a game if you decided to protect alien invaders instead of destroy them?

Ken Endo

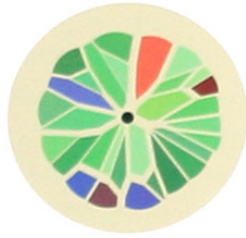
Endo obtained a BS and MS in Mechanical Engineering from Keio University, and a PhD from MIT Media Lab for his work on human biomechanics. Also at MIT he taught a course on orthopedic devices for developing countries. At Sony CSL Endo works on human physical augmentation using robotics technology. Named as one of the world's most outstanding innovators under the age of 35 by Technology Review in 2012, he was also among the World Economic Forum's Young Global Leaders in 2014.



A friend of mine is an above-the-knee amputee and I am aiming to make a really great leg for him. This is one facet of my drive to contribute to a society with no physical disability. Sony CSL is a fun place to work because it enables me to be the only person in the world to simultaneously develop three different types of prosthetic device: robotic, affordable, and athletic.



Hack the Body.



Prosthesis as Augmentation Technology

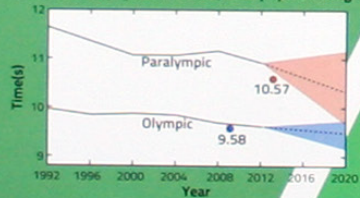
The current world record in the 100 meters, set by Usain Bolt in 2009, is 9.58 secs. The world record for an amputee, set by Alan Fonteles Cardoso Oliveira in 2013, is 10.57. Recent technological innovation has started to redefine our understanding of physical capability. This talk will reveal how technology can augment physical function and impact our lives.



Prosthetic devices can be made to suit different purposes and different budgets.

The winner of the Paralympic 100 meters might outperform the winner of the Olympic 100 Meters as soon as 2020.

100m Sprint: Olympic and T44(43) Paralympic Winning Times



Meanwhile, there is an urgent need for low-cost, high-performance prosthesis all over the world.



Masatoshi Funabashi

Having studied biology and mathematical science to master's level at the University of Tokyo, Masatoshi Funabashi of Japan went on to obtain a PhD in Physics at the École Polytechnique in Paris. Since then he has been at Sony CSL, researching sustainable agriculture, ecology, citizen science, and open complex systems.



The optimization of agriculture and the self-organization of ecology are two aspects of the ecosystem that are usually discussed separately, and applied differently in the two domains. I want to create a world where, rather than working against ecosystem functions, human activities actually promote them. Sony CSL is a perfect place to do this as it enables me to freely explore any area of study and helps me take action in the real world.



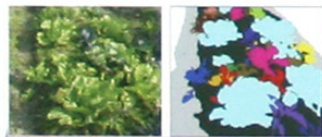
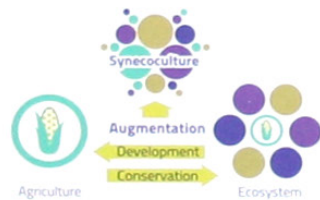
Syneco-culture.



Human Augmentation of Ecosystems

The Synecoculture project explores the self-organization of ecosystems and the relevant supportive use of information technology. By building a citizen science platform for the free sharing of information related to ecosystem services, the aim is to promote biodiversity and to empower us all to cope with such challenges as environmental change, peak oil, and population growth.

Human augmentation of ecosystems through the use of untapped edible plant resources can resolve the destructive trade-off between agricultural development and ecosystem conservation.



Napa Cabbage	Chrysanth	Cabbage	Chive
Japanese Radish	Potato	Coriander	Other Herbs
Carrot	Komatsuna	Burdock	Pathway
Eggplant	Red Cabbage	Cauliflower	

Not your typical vegetable patch. Synecoculture thrives on diversity.



Synecoculture

Some of the key concepts that will influence and be influenced by this new approach to food production.

Hiroaki Kitano

President and CEO of Sony CSL, Hiroaki Kitano received a BA in physics from International Christian University, Tokyo, and a PhD in computer science from Kyoto University. From 1988-93 he was a visiting researcher at the Center for Machine Translation at Carnegie Mellon University. Among numerous current positions he is president of The Systems Biology Institute, Tokyo, a professor at the Okinawa Institute of Science and Technology Graduate University, director of the Laboratory for Disease Systems Modeling at the RIKEN Center for Integrative Medical Sciences, and Sir Louis Matheson Distinguished Professor, Australian Regenerative Medicine Institute, Monash University.

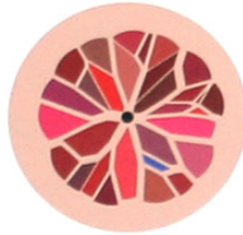


If we are to solve problems that arise out of the properties of open systems, then we must cross boundaries between research areas, organizations, and countries, then integrate knowledge and act based on the insights we gain. Such "boundaries" are all human artifacts.



Hiroaki Kitano

Think Extreme.



The Sony CSL CEO has smashed through countless barriers in his relentless pursuit of the truth.

Hiroaki Kitano is a dynamic iconoclast who has spent his entire career demolishing walls between realms of specialization in order to open up new vistas for the questioning mind. Along the way he has founded RoboCup, a global initiative to develop a fully autonomous humanoid soccer team that can beat a team of humans, and blazed a new trail for life studies with the establishment of Systems Biology.

These, however, are but two stellar achievements in an entire galaxy of glittering accomplishments ranging from running successful companies to winning design awards, and from advising international research programs to being an invited artist at the Venice Biennale and at the Museum of Modern Art itself. For a change of pace, Kitano serves as a member of the World Economic Forum's Global Agenda Council.



Systems Biology aims at systems-level understanding of living organisms. Biological robustness is used as a conceptual framework to help understand and modify cellular systems.



Hiroaki Kitano and Tetsuya Matsui presented an interactive installation in the main pavilion at the Venice Biennale in 2000 then took it to the Museum of Modern Art in 2001.

François Pachet

François Pachet from France received his PhD and Habilitation from Paris 6 University. A civil engineer who taught Artificial Intelligence and Computer Science at Paris 6, he is now director of Sony CSL Paris and leads the music research team there. His current goal is to create Flow Machines, a new generation of authoring tools that will boost individual creativity in contexts ranging from musical composition to writing and painting.



I investigate the appeal of music by building artificial intelligence systems that are intended to surpass their model. My work expands the realm of creativity, creates new forms of engagement, and leads to a better understanding of who we are. At Sony CSL, I have complete freedom to choose a study domain and appropriate ways to explore it. My evaluation methods include busking in the Paris Metro.



Style Cryogenics.



The Future of Music Assets?

Style cryogenics is about capturing the style of great composers, arrangers or performers so that they can be used to create new forms of music and performance. Style capture and representation techniques can be used to model the composition style of great jazz or pop composers, the arrangement style of great arrangers, or the playing style of great pianists.

Creativity often arises from playing with different styles. What if specific styles of writing, painting or music could be incorporated in new artistic efforts?



Texture and Structure



Style = Texture



Constraint = Structure

=



New object

Jonathan James (Conductor, Royal Symphony Orchestra)

“That is like a succulent, boozy Christmas pudding! Every chord a dense delight. I had to laugh it was so pleasing. I noticed a much more fluid, syncopated bass line and some extra passing notes in the middle voices - is this what you mean by ornaments?”

Jeff Suzda (Jazz saxophonist)

“Wow. This is Awesome.”

Applying a distinct style to the structural constraints of a separate genre is the basic creative operation to generate new artifacts.

Appropriate combinatorial optimization and constraint satisfaction within an adequate musical framework will evoke surprise and delight even in the professional musician.

Jun Rekimoto

The deputy director of Sony CSL, Jun Rekimoto from Japan received a BAsC, MSc, and PhD in Information Science from Tokyo Institute of Technology. Having joined Sony CSL in 1984, in 1999 he formed Sony CSL's Interaction Laboratory, which he continues to direct. Since 2007 he has also served as a professor in the Interfaculty Initiative in Information Studies at The University of Tokyo.



Human augmentation is an essential realm of study as it has such a close bearing on how we interact with technologies. No research should be conventional and in mine I am always looking for unconventional responses to challenges at the interface between humans and technology. Sony CSL offers me a great environment for breaking with convention and exploring crazy but ultimately useful ideas.



A New You.



Dawn of the Augmented Human

Technology leads ultimately to a world of enhanced or augmented human capabilities, both physical and intellectual. This talk reviews attempts to bring new possibilities to everyday life, including flying telepresence, human-human "Jack-in" integration, and augmented sports.

A personalized drone that can follow your every move represents one way to augment and change an individual's experience of everyday life.



Human-Machine Jack-in



Human-Human Jack-in



"Jack-in" is a concept that was introduced in the sci-fi novel *Neuromancer*, and referred to total immersion in cyberspace. As it becomes possible to jack into augmented reality, the world around us will come to life in new ways.



One feature of augmented reality in years to come will be users' freedom to adjust their interaction with it. Here's a prototype of a hover ball that can be customized to an individual's ability, making possible a fun experience for everyone.

Mario Tokoro

Sony CSL founder Mario Tokoro received a PhD from Keio University, and also an honorary doctorate from the University of Paris. He was a professor at Keio University and had visiting positions at institutions including the University of Waterloo, Carnegie Mellon University and the University of Paris 6. After breaking new ground in local area networks, concurrent object-oriented programming, and distributed computing in the 1970s and 1980s, in 1988 he established Sony Computer Science Laboratories, where he has guided researchers in their exploration of creative ideas. While senior vice president and chief technology officer of Sony Corporation, he laid the foundation for Sony's consumer products software platform. Tokoro's research these days focuses mainly on two applications of Open Systems Science: Open Energy Systems and Open Systems Dependability.



Here is my message to the world community of scientists: our responsibility is to people, to humanity. If I contribute to humankind, to humanity, then that is a real reward.



Mario Tokoro

The First 25 Years of Sony CSL and Open Systems Science.

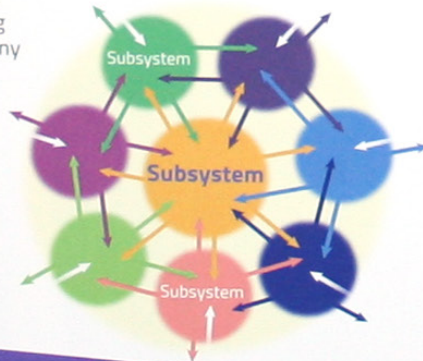
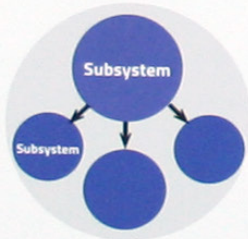


Mario Tokoro, in Conversation with Adam Fulford

Since being launched in early 1988, Sony CSL has contributed greatly to the company that continues to fund it. Ironically, though, from the outset the wellspring of CSL's value has been its independence from Sony Corporation. Unfettered by any conventional R&D or other corporate obligations, CSL researchers are free to explore paths to a better world. This would not have been possible without the foresight and guidance of Mario Tokoro, who at the Museum of Modern Art will be looking back at the first quarter century of Sony

CSL, and examining the key characteristics of a scientific methodology so powerful it can change the world, the way you perceive reality, and the choice you're making—right here, right now. Our conversation will offer the audience an opportunity to enjoy the company of a living international treasure in the world of science and technology.

Adam Fulford, writer/editor of the booklet *The Point of Knowing*



Every system, including its subsystems, is open. Changes in one subsystem may influence and be influenced by changes in other subsystems, and the entire system may influence or be influenced by changes in the environment around the system.

Yuichiro Takeuchi

Yuichiro Takeuchi is a Toronto-born, Tokyo-based computer scientist whose work on "habitable bits" explores the intersection of digital technology and architecture/urban design. In cross-disciplinary research, his aim is to infuse the built environment with the interactivity and plasticity of digital bits. He holds a PhD in Informatics from the University of Tokyo and an MDesS from Harvard University.



Designing better cities is a critically important contribution to the human race. I'm trying to design a built environment that's dynamic, diverse, democratic and fun using methodologies originally developed for smartphone apps and wearable gadgets. Sony CSL is the only place that can offer me the flexibility I need for my uniquely eclectic approach to research demands.



Habitable Bits.

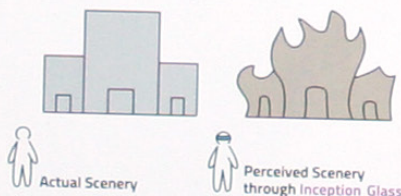


Interactive Cities of the Future

This talk covers ways to apply a wealth of know-how accumulated through interface research—everything we have learned so far about the design of interactive apps, gadgets and systems—to the building of better architecture and better cities.



In the future, we will live not in "classic" architecture but in Habitable User Interfaces, or HUIs, which will transform architecture. One early example is MIMMI, an inflatable sculpture that expresses the mood of Minneapolis.



Wearable devices are finally coming of age. Altering perception via smart glasses represents one variant of the HUI concept.



One day, the environment itself may be printable.

Annette Werth

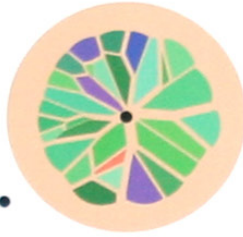
Sony CSL Assistant Researcher Annette Werth from Italy obtained a BS in Electromechanical Engineering and an MS in Computational Intelligence at the University of Brussels. She is currently a PhD candidate at the Graduate School of Engineering of the University of Tokyo. Her research explores renewable energy distribution for local communities, with a special focus on developing countries.



We live in an age when the choice of energy technology determines the future of global society. I am working on solutions that will lead to a more sustainable world, challenging even the most basic fundamentals and implementing real-world prototypes and platforms. At Sony CSL, not only am I encouraged to propose and pursue groundbreaking ideas, I have access to excellent guidance in diverse spheres of knowledge.

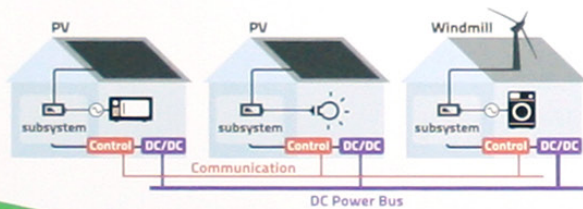


Open Energy Systems.



A Peer-to-peer Electricity Grid

Open Energy Systems (OES): a radical approach to the distribution of renewable energy with minimal infrastructure costs. This peer-to-peer like system balances supply and demand within the community, thus increasing energy autonomy. The concept and feasibility are being tested on a decentralized OES platform in Okinawa.



Here is one way to think about bringing distributed DC into a community, with or without the existing AC grid.

The site of the experimental OES system in Okinawa, where 19 houses generate electricity for all to share.



Open Energy Systems solutions will offer sustainable access to electricity even in locations where no grid exists.





The Museum of Modern Art, New York
Monday, September 22, 2014