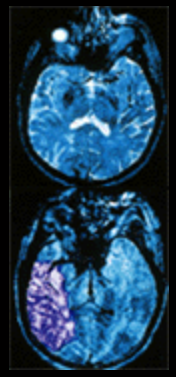
New Minds

October 18, 2006

Prof. Vibeke Sorensen



What is creativity?

“Creativity is a condition of life”

Fritjof Capra

The Hidden Connections, A Science for Sustainable Living *(2004)*

Organic systems change and adapt to a changing environment by producing spontaneous new order, and this can be seen at all levels of life, from the most simple molecules to the most complex social and ecological structures.

This natural condition of living things includes freedom of gesture, as both physical and mental movement, thus free thought and improvisation.

Conversely, their destruction is destructive of life.

All organic, living things are sensitive to their environment, taking input, interacting, adapting, and cycling again, in order to survive.

This sensitivity of living things to their environment is *a form of consciousness.*

Diversity in adaptation both arises from and contributes to diversity of the ecosystem, *including human beings and their cultures.*

Because they are dependent on their environment, their function and dysfunction shed light on that environment. This is perhaps the most important indicator of health, and the sustainability of a living system, or ecosystem.

The health of an organism can be seen or measured according to the change in characteristics, visually as morphology.

All living things are interconnected as part of a large, macroscale ecosystem, which is now endangered globally.

Why do we have brains?

According to John J. Ratey, in his book *The User's Guide to the Brain, Perception, Attention, and the Four Theaters of the Brain,* we have brains because we move.

We need to consider the consequences of our actions before we act, so that we don't kill or injure ourselves.

The impressions, thoughts, and ideas we have of the world come from movement and perception of it.

Physical interaction with the world generates connections between a network of brain cells. This causes patterns to be formed among them.

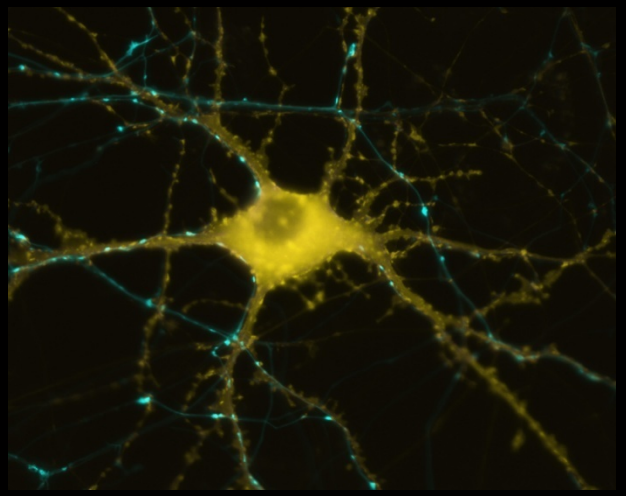
Memory is the playing back of these patterns. Physical movement stimulates mental movement.

Feelings are impressions resulting from the senses in combination with memory.

Thoughts are what result from these impressions, by contemplation of them.

Words approximate these memories and feelings, and are constantly changing as memory is compared to new sensory impressions.

There is a small animal in the sea that starts out moving and with a brain, but during its life it becomes sedentary and when this happens, it eats its own brain.



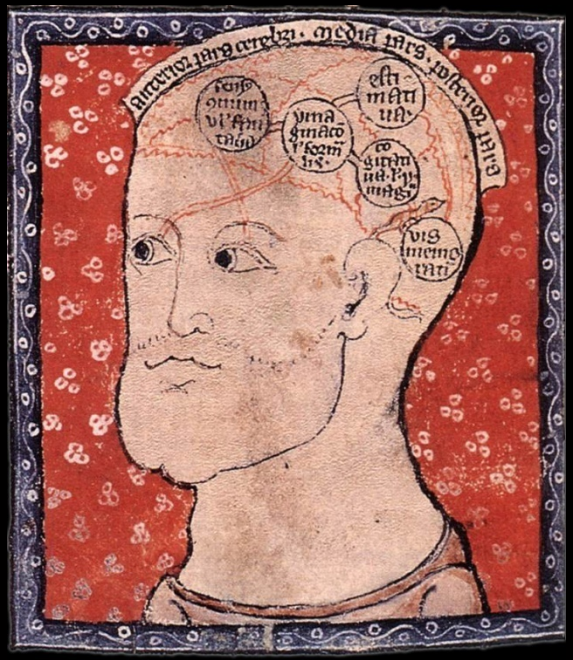
Why do we have language?

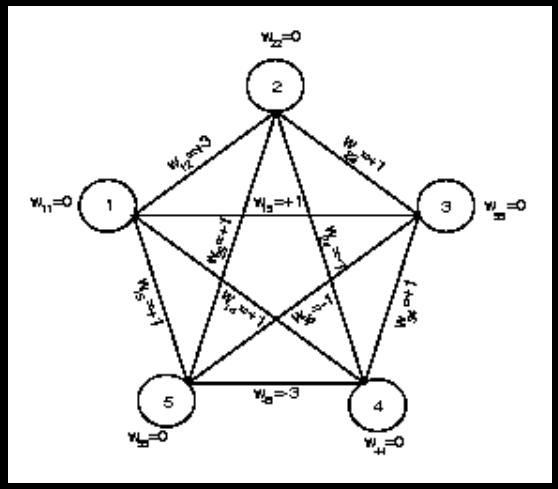
Also according to John Ratey, we have language so that we can slow down our responses and behavior. It is needed to more deeply consider, or think, about the consequences of our actions, and play out in the mind through new arrangements of memory fragments, or ‘mental maps,’ possible scenarios. All of this is so we can take the best course of action. We can “think through” problems, and solve them.

There is language for all of the senses: verbal, visual, and body language, and they all inter-relate.

Narrative is the meaning we give to sequential sensory experience. We are always making a narrative, and for human beings we know it as a continuous stream of consciousness.

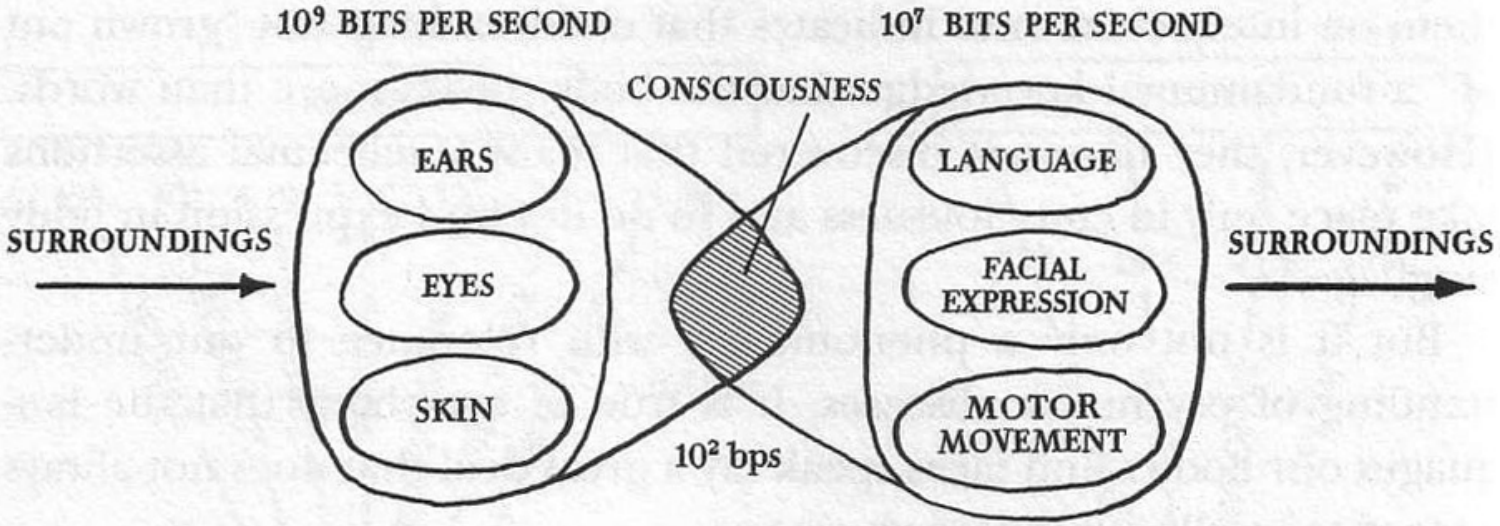
How the brain integrates sensory information so disparate across the electromagnetic spectrum as sound and vision, but also smell, touch, and taste, and conforms it to the exterior world, is a mystery called *The Binding Problem.*





As Tor Nørretranders said in his book, *The User Illusion*, there is much more information coming in through our senses, that is disregarded but turned into expression through our bodies than we actually think about actively, in what we usually regard as *consciousness.* He calls the part coming in as impressions, *information,* and the part going out as expression, *exformation.*

Exformation is more important than information. It is more important to know what is going on in people's heads than to understand the words they speak.



Consciousness between impression and expression, sketched by W. D. Keidel of the Erlangen School.

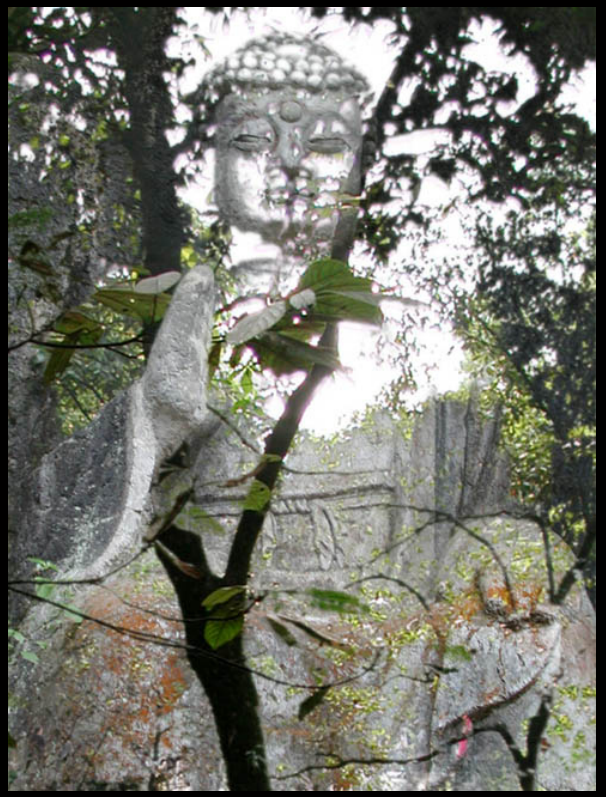
Tor calls the thinking, reasoning, and contemplative self the "I" and the expressive self the "me." Both are intelligent and use stored memory updated with new sensory experience.

But what is the “mind”?

Most people consider the mind to be the rational, conscious, thinking part. But it really isn’t so much in control.

Our “intuition” is really a kind of “common sense” or what I call “implicit” knowledge, something that is gathered up over time and after practice and rehearsal, appear automatic. Driving a car is an example – first a person needs to learn how step by step. After a while, it becomes automatic. Or when a musician is learning to play an instrument, or an actor learning lines. Eventually, the “me” has to take over from the “I”, and make use of a lot of additional information in the environment to perform well. It is always a response to the environment, and the audience knows it.

In China, where I visited recently, someone said that when I used the word “spirit” in a talk I gave, they understood that I meant “mind” or “consciousness,” and that “spirit” is a Western concept.



In the West, we were taught that the brain, or mind, is split into 2 halves, the Left and the Right. Left, we were told, is verbal and rational, and Right is visual and emotional. Reasoning through words and abstract ideas would lead us to truth. The senses were not to be trusted because they could deceive us. Only if the sensed world conformed to the ideal, perfect, abstract, and I might add weightless 3-D virtual space, a model or simulation so close to the real, would it be considered truth. Truth became the representation, an abstract model, a template, rule, axiom that formed a conceptual foundation, a universal reference. Reason alone, it was thought, could uncover these truths. And so history, at least much of it in the West, proceeded.

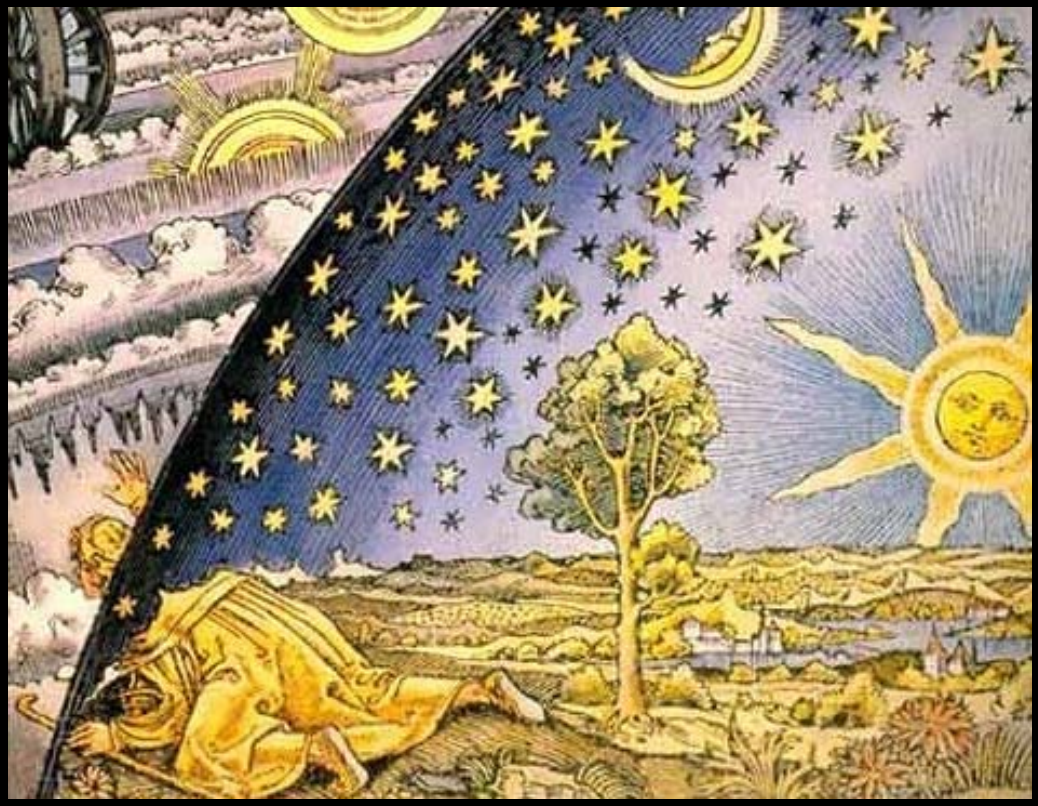
Reason was considered more important than feeling, emotion, ethics, or *heart,* despite the fact that all thoughts arise from a combination of the senses and memory, within a cultural context.

All language is a product of human and cultural activity. *As Umberto Eco, in Serendipities, On Language and Lunacy,* said, language evolves through individual invention and transfer from other people and cultures.

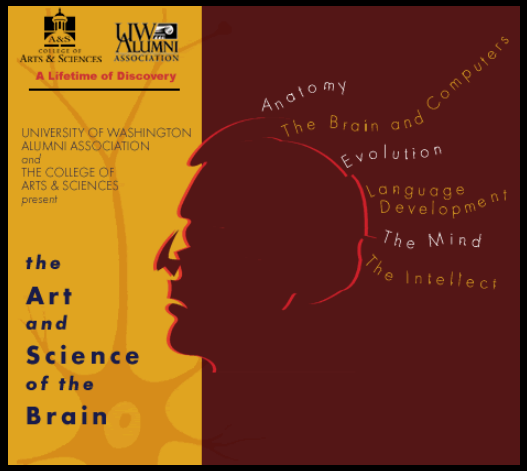
The separation of reason from feeling-emotion-ethics-heart, and culture, is an artificial dichotomy, because they all co-exist in complex ways. Nevertheless, we have lived with this dichotomy for many centuries. It led to the material-spiritual, mind-body, and art-science splits.

Perhaps “universities” should be called “diversities.”

The idea of a “universal man” became an anachronism in educational institutions, with deep and profound specialization dominating curricula and research. Ironically, advances and insights often come when assumptions are questioned, or when new information enters the knowledge base, thus transforming ideas and sometimes creating whole new fields. As Carver Mead of California Institute of Technology said, “New fields arise from the synthesis of other fields.” He himself put together a seminar with physicists, computer scientists, and biologists. From it emerged the field of computational neurosystems, which now is known as neural nets.



Like language, individual invention and transfer from other cultures, catalyzes evolution in academic fields, also cultures that use language. Methodologies of cooperation between specialists in diverse fields not only exists in areas such as architecture, design, and cinema, but it is an active strategy in many other fields and professions today. The success, products and innovations, points to not only a meta-methodology, but to a larger transformation in academia and industry. Previously separated fields are joining, forming new fields and re-unifying the larger domains of art and science. This is a positive development largely due to computers, which catalyze transfer of information through a common medium of communication. The body and senses are the same across disciplines, and so languages based on them that are merging, are becoming a meta-language, a common language that is not only multicultural across fields, but between nations as well.



I would like to return to the art-science split that has existed for so many centuries, and still does.

One of the problems that developed with it is the idea that some cultures are superior to others, because of their advanced technologies. And when a colonial power tried to dominate another culture, they typically adopted only those things that were utilitarian and destroyed everything else, all cultural memory. This led to a dominant culture that valued utility and efficiency, but lost the respect for other cultures, their ways of life, knowledge, and languages.

Many of the technologies that people point to today as a measure of our advanced state, are themselves technologies of domination, and natural and cultural destruction. This approach to the use of reason, divorced from feeling and emotion, empathy and ethics, may be artificial, but it has had enormous consequences for life on the planet.

It is possible to view a society that places value mainly in efficiency and utility as one that is part of a history of domination and destruction of cultures and nature, and hence denigration and disrespect for creativity and life. Both are of course the basis for their existence, and necessary for survival, so destroying them is ultimately suicidal. But this is what is happening now with the help of our technologies, which are now so large. And the scale of destruction is just as large.




One of the possibilities in thinking about this phenomenon is the reconstruction of sense experience and behavior through artificial worlds that replace instinctive and implicit behaviors with unethical ones, for example war games that teach killing with seductive sensory media, including moving images and sounds normally associated with life affirming activities.

Real guns are now connected to the internet, and people can shoot living things, people and animals, through the comfort of a remote, invisible technological filter.

Surveillance technologies not only make this possible, but many other unethical activities done in secret. Clandestine activities are clandestine usually because they are unethical, if not illegal in civil societies. The victims are often innocent, and because they do not know who is perpetrating the hostility, are unable to defend themselves. This is a big problem in the world today.

And technology is moving into the body and brain. We need to critique it while we can.

GAMING

War Games

Videogames are no longer just for thrill-seeking teenagers. The new breed of handheld consoles are sophisticated devices that offer much more than gaming. And the competition is fierce says Simon Munk, Editor of Games-digest.com.

If you think videogames are for geeks, think again. In the last few years games have moved from nerdsville to the mainstream. Now there is with something for everyone, from five year-old girls to grandma. And they've got slicker – with the power of the new consoles delivering lifelike visuals and attracting Hollywood stars and scriptwriting talent for more dramatic stories.

While the games have got better and bigger, the devices have been getting smaller and sleeker. The latest generation of portable consoles fit complex, realistic games in the palm of your hand, enabling you to conquer worlds on the bus, train and plane. New machines have come and gone, but there have only ever been two real contenders for the handheld console crown. So who is the king (or queen) of portable gaming?

Sony PSP

£179.99
www.yourpsp.com

The Sony PSP has got loads going for it. It combines almost the same level of computing power as its home console sibling the PS2, but in a compact, stylish machine with a range of 'multimedia' powers. In other words, it doesn't just play games – it plays movies and music and wirelessly surfs the web too. No wonder it's the hottest gadget around. Owning a PSP is guaranteed to have iPod-addicts weeping with envy. However, there are a few drawbacks to this all-singing, all-dancing wonder. Firstly, the movies come on the same oddly triangular 'UMD' discs as the games. If you already own *Spider-Man 2* on DVD, you'll have to buy a whole new copy. Secondly, the power of all the PSP's processing means the battery life is short – around four hours for gaming. And for a multimedia device, there's no hard drive, so storage space for music is limited.

These are minor quibbles, though. On the upside, the power, the range of games and the wireless internet connection for both multi-player gaming and web-surfing are all great.

Must-have game:
WipEout Pure

The classic PlayStation super-fast racing game features twisty, science fiction tracks; sleds-with-guns instead of cars; and a pumping soundtrack.

Runner-up: Lumines

Arrange blocks and clear sections of the screen according to colour, all set to a rhythm. It's like a musical, funkier Tetris, and about ten times as addictive.

SO NOW YOU KNOW...

Power:	●●●●●
Range of games:	●●●○○
Design:	●●●●●
Ease of use:	●●●●○
Not just games:	●●●●●

At the same time it is possible to use the same tools to make poetry. I was so touched by the project I saw taking place this week in the IEAT, with Chico Marinho and others.

Unfortunately, we cannot forget that this mass destruction behavior is appropriating or vampirizing media culture and inserting unethical and anti-humanistic messages into it. It is a culture war using culture, using new media especially.

The late Prof. Eduardo Leone, from the Film School at USP had an expression for this, “Vampires always destroy the beauty.”

We are now in a global crisis with the ecology and we need solutions quickly. Of course our brains are capable of solving problems, but in this case it will not be by reason/science or emotion/art alone. They need each other. We need all fields together thinking about these enormous common problems of survival.

Think about it:

30,000 species are going extinct every year, and within 50 years, 30% of all species will have disappeared. Less than 20 species supply more than 80% of what we eat.

Within 100 years, there will be a mass extinction due to human activity and transformation of the planet, including by global warming and over consumption. The most advanced technology is contributing to it.

Only 3% of the planet's water is fresh water, but we can only access 2%, mainly due to pollution.

For the last 40 years, the population of the planet has doubled (2x)

During this time, water consumption has been quadrupled (4x)

Continuing this way, we are headed for a worse crisis. Wars will be fought over water, say some scientists. Privatization of the most basic necessities of life, water and air, began years ago. Is ethics a consideration when profits are the absolute priority for a corporation? So far, the answer has been no.

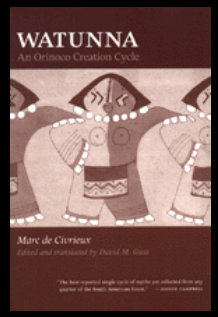
So art and science have important work to do, now. But we need the smart minds, with reason and heart, from all fields to participate. One way is to begin at home, living in sustainable ways, closer to and in balance with our local ecosystem. This may help restore many that are fragile and in danger of disappearance.

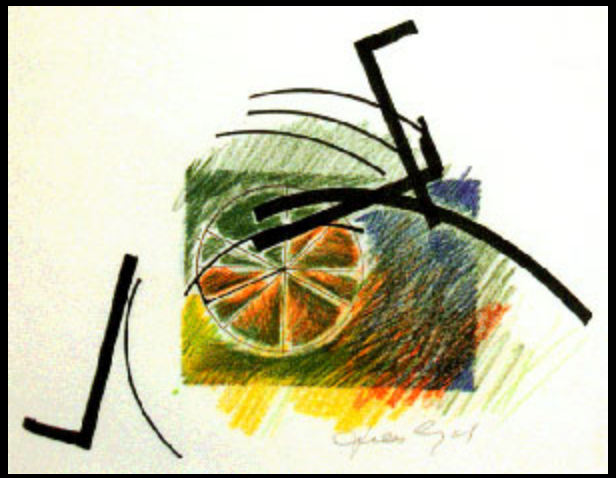
Is this why there is so much more transdisciplinary activity today, globally?

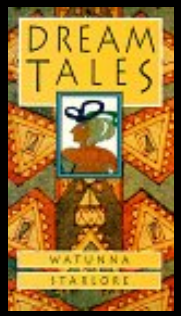
Unfortunately, no, I don't think so, but it could help!

As I said earlier, I think *the computer* has helped bring fields together and catalyze the creation of new ideas and fields. But there are many historical precedents of transdisciplinary and transcultural activity stimulating innovation and imagination.

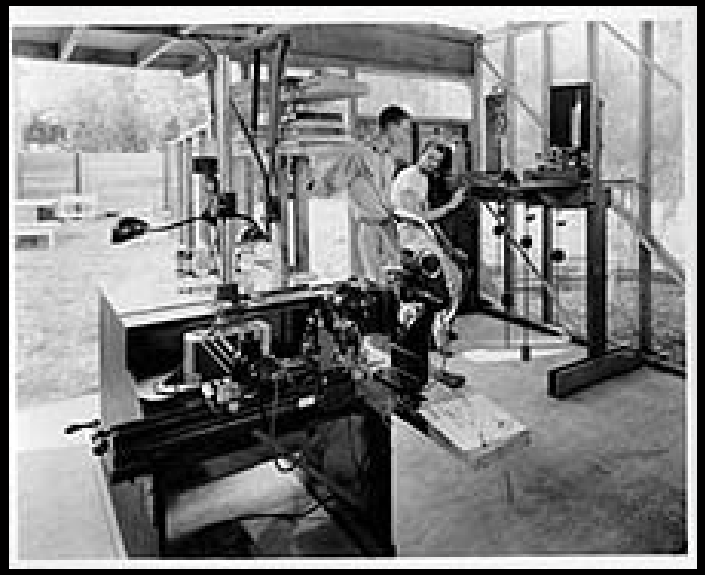
Experimental animation, in particular, has been a place for dynamic pluralism of creative activity. In fact it had a central role to play in the invention of computer graphics.

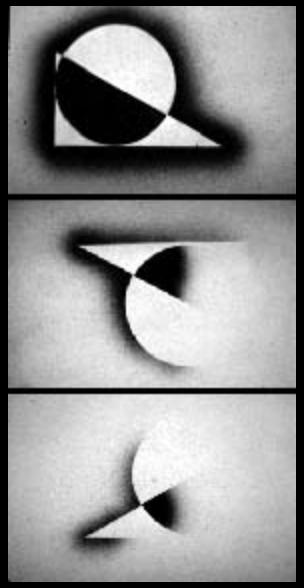


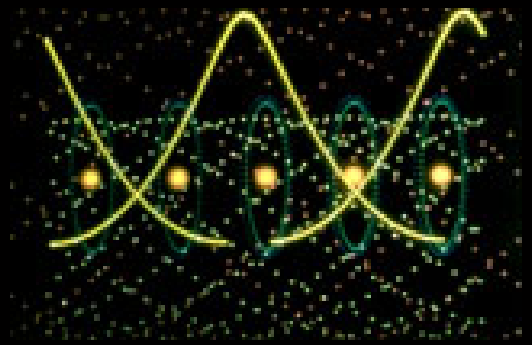




John Whitney Sr., considered the father of computer graphics. He used a ballistics computer to move visual images according to sound wave data, while developing a theory of visual music, and unifying visual and sonic waveforms.







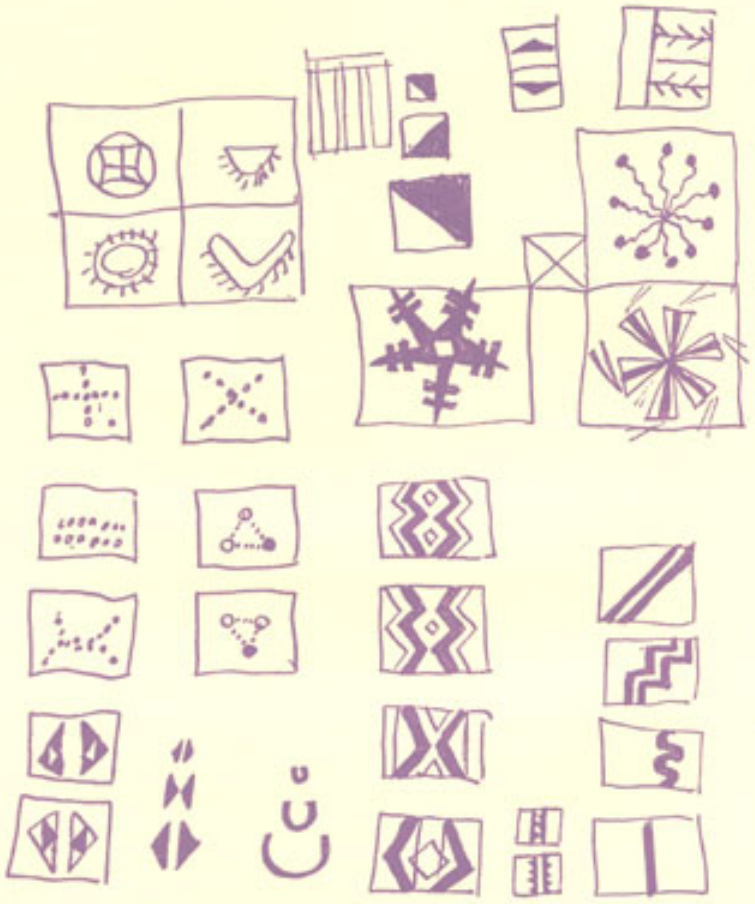
Happy Moments

Text & images by Len Lye

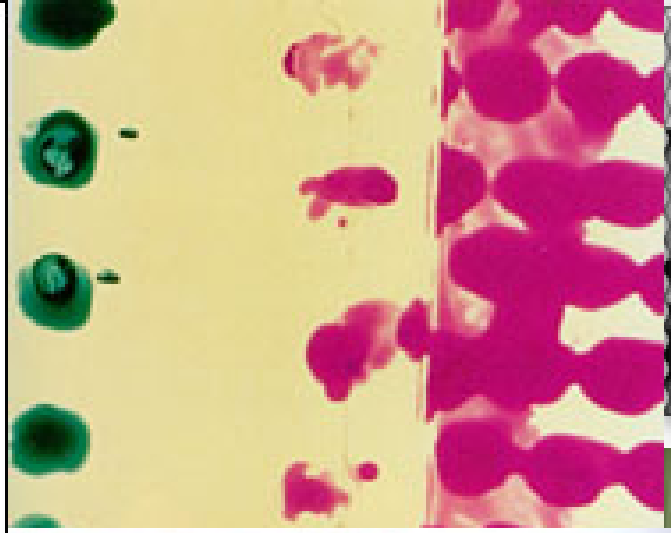
Edited & with an afterword
by Roger Horrocks

Len Lye used animation to externalize thinking, and transferred batik fabric printing to film as a way of exploring dynamic patterns and their transformations across cultures. The utility contributed, and adopted, was the tri-color film process he invented.

The Holloway Press




LEN LYE
a biography Roger Horrocks

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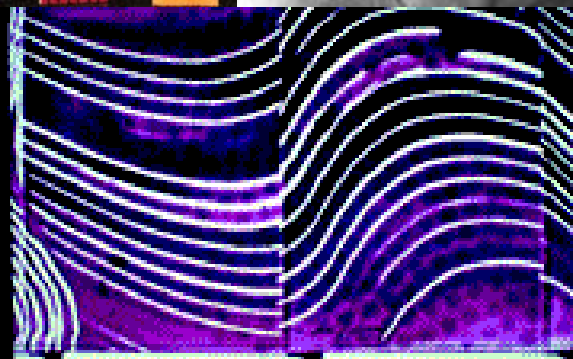


Computers extend animation language, and animation assimilates disparate time-space media.

By reducing and transforming dimensions (film is space re-configured from 3 into 2D plus time) it is possible to see and understand our world in new ways.

It is not surprising that animation is one of the fastest growing artforms in the world today.

It is useful to science, documentary,news, and entertainment. And yes, to other activities.

Other precedents of methodological integration as a strategy for innovation, includes XEROX PARC, where conceptual artists working with computers wanted to print text quickly. They developed desktop publishing.

Bell Laboratories brought composers into their labs in the 1960s to experiment with sound, and this catalyzed improvements in telecommunications technology, and at the same time the development of electronic and computer music.

Dr. Max Matthews, the director of this program said in an interview with me some years ago, “Artists working with technology accelerates the development of those technologies.”

Our geniuses are those who can see patterns and connections in nature, and in fields and cultures.

There is a science of patterns and dynamic systems; complexity, chaos, and emergent systems. It’s not just abstraction, but variation upon biological, genetic, and evolution models.

Conclusion: the crossover of fields and methods is a fertile paradigm for invention.

One could imagine an academic “field generator”, using the computer to combine elements of those fields.

The box below is a mental exercise – you fill in the boxes. It could be three dimensional, and between more than one field. This could be a way to start discussion about interdisciplinary courses and curricula, too. But we need to communicate in a common language, without jargon, and educate each other.

	visual art	sculpture	theatre	dance	music	architectur	literature
biology	bio-art	bio-sculpture			bio-music		
chemistry							
physics							
neuro-science							
medicine							
social science							
philosophy							
history							
informatics							
anthro-pology							
ecology							
Geography	visual geography						
Engineer-ing							

But we need more existence proofs that art and science can actually find ways to work together.

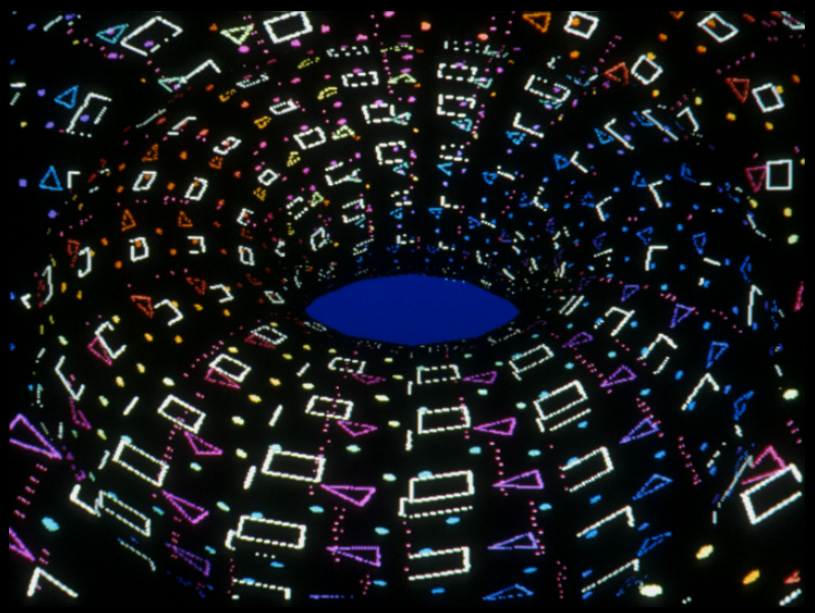
In my case, I worked at Princeton University from 1990-93 where I team taught courses with Dr. David Dobkin, where we taught a common problem from 2 opposing points of view.

While there, I showed NLoops, an exploration of visual polyrhythms in 3D space. A computer scientist used the visual idea to solve a complex dynamic problem.

I developed a stereoscopic drawing program that my colleagues at Caltech told me should be patented. I was a Visiting Associate in Computer Science there for 9 years, from 1983 – 92. My role was to transfer ideas to scientists from the arts and humanities. One of the students I worked with created the first synthetic retina, Misha Mahowald.

At USC, in the late 1990s, I worked with Dr. Mark Thompson, to develop light emitting prints, that would then also animate, now called wafer thin displays, transferring concepts from lighting and printing to computer graphics.

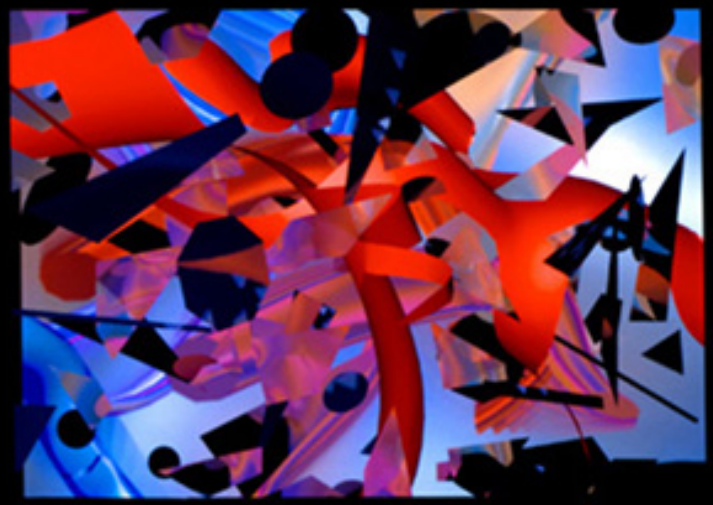
At the San Diego Supercomputer Center, from 1988 - 92, I worked with x-ray crystallographers to develop the Interactive Stereoscopic Animation System, funded by the National Science Foundation. My job was to transfer art concepts to science, for scientific visualization. He initially became interested in my solution for irridescent color in the butterfly picture on the right.



1989-93 San Diego Supercomputer Center

Interactive Stereoscopic Animation, funded by National Science Foundation, co-Pis Vibeke Sorensen and Dr. Lynn Teneyck, with computer scientists, Phil Mercurio. Still images from *MAYA,* 1993.

Structured musically, inspired by the Hindu term for the conflict between illusion and reality.



One of the best examples is the Mindship in Copenhagen, Denmark directed by Tor Nørretranders, a visionary thinker, and author of *The User Illusion,* who I mentioned earlier. He is a philosopher of science, and widely considered the most important science writer in Scandinavia.

Mindship took place in the summer of 1996, coinciding with Copenhagen serving as the Cultural Capital of Europe.

The goal of his seminars was to encourage collaboration between artists and scientists from different fields and countries, and a new way of discussion and interaction beyond the normal academic way.

It took place in Holmen, across the harbor from the Little Mermaid, in an old Navy Shipyard. He chose a beautiful place because the environment affects thinking. There was a computer lab, desks for each participant to work, a library, a gallery, a public performance space, and a place to eat, the Cantina. This was also a restaurant for family to join in. Everyone lived nearby, either in hotels or rented homes. Most people could take the boat to Holmen, but others bicycled.

There were 3 summer sessions:

Mapping the Mind
Order, Complexity, and Beauty
The World View of the Third Millenium

The ground rules were that everyone should:

say yes before they say no
speak in everyday language, no jargon
use specific examples rather than generalities
follow the schedule, attend all of the talks
participate in public events
be prepared to be exhausted due to new brain activity, which would be very tiring.

I was in the second session, Order, Complexity, and Beauty, which included 15 artists and 15 scientists together for 3 weeks.

[Note to Tor: At this point, I read directly from the materials that you sent to me, quoting your text about why you wanted us to use everyday language, including the quote from Nils Bohr. I then read parts of your description of the 3 summer sessions and what they were concerned with. I also listed the participants and some of their activities, and ended with the group I was in, thus connecting to the next image.]

30 participating artists and scientists included

evolutionary biologists
computer scientists
complexity theorists
mathematicians
philosophers
physicists
social scientists
composers
visual, installation and performance artists
art historians
writers.

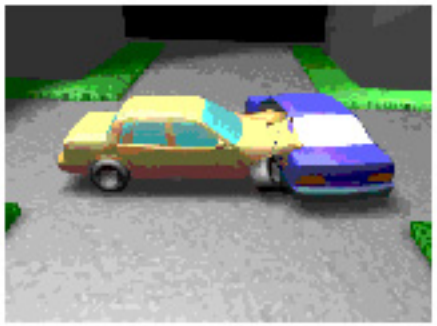
An anthropologist, Lotte Broe, studied us!

1996
MindShipMind

- Collaboration with Austrian composer Karlheinz Essl
- Problems with communication between people from different disciplines, so I decided to build bridges between their ideas directly, to ‘fix it,’ to transcend disciplinary borders. I asked the participants to write 1 page position statements describing their points of view on the themes of the seminar, provide some images, sounds, or additional materials (non-textual) and prepared additional commentaries and data myself. I explained to the participants that it would be used for a gallery exhibit.
- The idea was to algorithmically deconstruct all of the texts grammatically and put them into combined semantic database structures, and then reconstruct them semantically and in real-time, using a computer voice to read the new meta-texts and screens to display the ‘thoughts’ in a never ending, collective ‘stream of consciousness’
- The computers would be installed in the gallery, together with found objects from the building, reflecting the influence of the physical environment in which this special seminar was taking place
- Karlheinz Essl, the Austrian composer, was very interested in the idea and offered to help develop and produce the project, making MAX/MSP patches to process sound and data, and extending it to a larger and more complex piece
- texts were algorithmically processed by a Markov-chain based computer program in order to produce the "meta-texts". New texts were generated from text ‘particles’ using random operations and weighted probabilities, to produce a never ending book and stream of consciousness voice
- resulted in mind-challenging associations and meanings that go beyond the normal, logical connections
- It was a kind of ‘digital social work’ to encourage communication across fields
- The titles of the pages were anagrams on the seminar titles (the Concept of Complexity, the Beauty of Boundaries, and the Biology of Beauty)
- Credits displayed on the pages are also reconstructed, and eventually everyone is credited for everything

Bedroom Cruelty Epataxy

Contemplating
George Markowsky



social order is informed by biological and environmental stresses

Vocal sound material courtesy of Trevor Wishart

Recomputed Boxy Reality

Based on a novel about
William Hamilton

judging of nature is by language of the observer

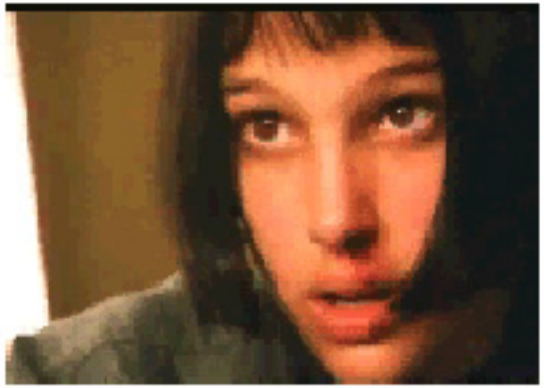
new ways of communicating a message establishes new structures

Face morphing courtesy of Karl Grammer (Ludwig Boltzmann Institute for Urban Ethology , Vienna)

Recomputed Boxy Reality

Fibonacci series provided by
Morten Carlsen

like expanding consciousness

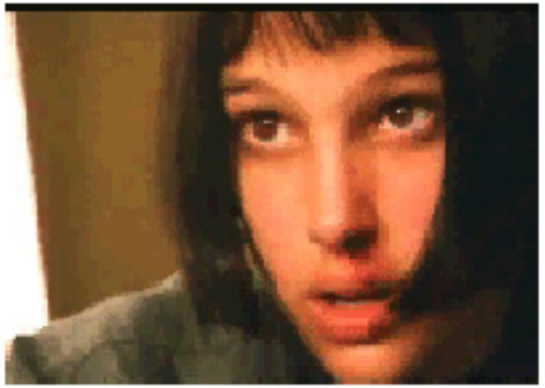


Excerpts from Luc Besson's movie "Léon the Profi" (feat. Jean Reno)
Music by K@rlheinz Essl: In's Offene (1991) for flute, clarinet, violon & cello

Permuted Royalty Icebox

Controlled by
Kåre Bjerkø

which can be regarded as cultural values



Excerpts from Luc Besson's movie "Léon the Profi" (feat. Jean Reno)
Music by K@rlheinz Essl: In's Offene (1991) for flute, clarinet, violon & cello

Netscape: MindshipMind

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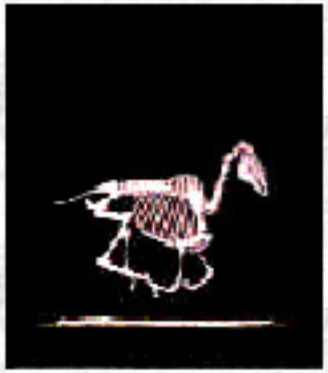
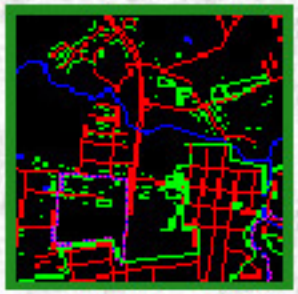
Location: http://www.essl.at/cgi-bin/swrap/cgis/mindshipmind.pl



pointing to a borderline
is consciousness constructed from the elements of language and biology?
from ideas, bodies, habitats, language, food and drink
the various schemes



art is a database
the advent of computer-aided studies
being the result of simple dynamics
order is a mindtrip

File Edit View Go Help 1:13 PM

Netscape: MindshipMind

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Helpful thoughts from Natalja Struve

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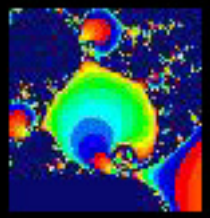
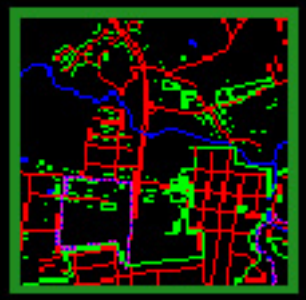
such as learning from mistakes as a paradigm for learning
the more we know, the more we know the less we know
molding the faces
thought is energy





and it is not random that there is randomness
but the relationship between the parts and the whole
due to internal asymmetries of the brain
and close relations to the environment

Results from the seminar that continued the work and concepts developed during the Mindship Seminar:

- Tor made 27 half hour documentaries for Danmarks Radio, the ‘BBC of Denmark’
- Art historian, Prof. George Hersey, wrote and published the fascinating book “The Evolution of Allure” building on the ‘Biology of Beauty’
- Composer Karlheinz Essl continues to work with chaos and complexity in his music
- I produced ‘Morocco Memory II’ and ‘Sanctuary’ using complexity and combinatorics applied to media elements in an interactive installation, extending the transdisciplinary media approach to global multiculturalism
- The 2007 ACM SIGGRAPH Art Gallery, Global Eyes invites people from all cultures and fields who are making creative work that offers alternative uses of image-based digital technology and addresses global social, political and ecological concerns, to submit work to a major international exhibition of media art. See http://www.siggraph.org/s2007/presenters/art/

Examples of my work informed by the Mindship Seminar

1999 *Morocco Memory II*

Explores dynamic memory and narrative by interactively re-contextualizing mediated memory fragments, personal and cultural. 66 lexia, 3000 still images, 100s of movie fragments and sounds

Re-membering stimulated by *all* of the senses, including smell, touch, light on skin, movement of body in space, visual images, text and sound

Lateral interaction strategies require people to cooperate rather than compete

Employs combinatorics, weighted probability in logic of program to make lateral structure each experience is unique and it is an *emergent system*

Small house made of wood and satin

6 wooden boxes with spices in them.
The metaphor is *the mixing of smells is like the mixing of memories,* activating long and short term personal and cultural memories.

Each box has an *embedded system,* a small circuitboard set inside the box, under the spices. It detects the state of the box and then wirelessly transmits this information to a computer via a receiver. The receiver is under the table and hard wired to the computer.

This allows people to pick up the boxes and carry them about as they move inside the house.

Unlike many artworks and museum exhibitions, this piece has an active role for aroma, and touch is encouraged. The entire body and groups of people are inside the work, and all of their senses are active elements without which the piece does not function.

In this way, it foregrounds people and backgrounds technology, while welcoming traditional world cultures.

Installed at Interactive Frictions at USC in 1999 and World Art in Aalborg, Denmark in 2000

Homage to Ars Nova, Coral da UFMG
Mestres da Musica Colonial Mineira

Filiae Jerusalem

Concluding Comments

Excerpts of an on-line interview with Tor Nørretranders

Vibeke: What do you think are the most important problems today, and how can art and science address them?

Tor: Creating a civilization based on renewable energy and distributed social networks.

Vibeke: Do you have any thoughts about the future of art and science, thinking back on Mindship?

Tor: There are two kinds of minds in the world today. There are the ones who are obsessed with what they already know. They are the minds of yesterday, the minds of a world of elites, status, headquarters, control and industry. But there is also another kind of minds: Those who are interested in what they do not know, the minds of seekers, explorers, fantasy, play and communication. These minds have always existed, in the rare and courageous artists and scientists who created our culture. We call them geniuses because they were interested in what they didn't know, rather than boasting what they knew. But now, with the advent of the internet and with the digital culture democratizing the means of learning and expression, everyone can start attending what they don't know, rather than what they know. Lay people meet art and science and understand how much they do not yet understand. When scientists and artists start cooperating, they each become lay people when confronted with the world of the other group. They understand how little they understand. And they become more open towards everyone else who does not understand.

Brazil, UFMG and IEAT

Because of the dystopia of the developed world, the only hope for a utopia now is the developing world. In particular, Brazil has this possibility, because of the positive changes over the past few years, the advances in research, technology, as well as social programs, including education and health care. And the remaining natural environment, and its great importance worldwide. Just as important is your humanism and ethical perspective.

The Federal University of Minas Gerais (UFMG), and the Institute for Advanced Transdisciplinary Studies (IEAT) has the critical mass of people across fields necessary to thinking in new ways across fields, necessary to solving complex problems that transcend any one field. So UFMG and IEAT hold a key to this potential, and so I am especially touched to be invited here now to see it unfolding, and to participate in it. Congratulations on your success so far, including well deserved prizes, and I look forward to seeing more!

Some of my personal dreams for a better future

Vision: the vision is a collective vision! To dream together, making a better world for all living things. Utopian in the Latin sense, that in our dreams we can solve the problems of today in a connected way, and when we awake, our collective dreams help us to live in a more responsible way, changing what we do together today, making the world a little bit better. When we dream together, we help everyone live more responsibly in the world, sharing our knowledge and solutions. So people and nature matter! Open, democratic, sustainable. (It is not pre-ordained that we have to fall victim endlessly to destructive ways, we can put our energy and focus into alternatives that are positive and work.)

Goals: collaboration with you and others for a sustainable future! Global-local knowledge. Life and death are not economic matters, they are ethical. Focus on education, research, as well as production and dissemination of it

Strategy: transdisciplinary research, connecting architecture, biology, informatics, visual art, sculpture, IT, media, medicine. The space between fields is a place of discovery of new knowledge.

Learning from and building upon the beautiful example of the Mindship.

Project: The Amazon Boat

Boat with state of the art research facilities for 30 artists and scientists sailing on the Amazon River in Brazil

Alternative, sustainable communities

Media integration of documentary, animation, and scientific computing
especially to bridge the naturalist's knowledge in native populations, with scientists, including handcraft and folk art, which are disappearing quickly in the developed world, with media art.

A "collaboratory" of artists and scientists, like the Mindship and IEAT!

The possibilities for imagination and creativity are endless, for new ways to see the world that can help solve the largest problem humanity has ever faced, that of the survival of the planet.

Thank you!