

## **Creative Prototyping as an Inter-Dimensional Portal Between Disciplines**

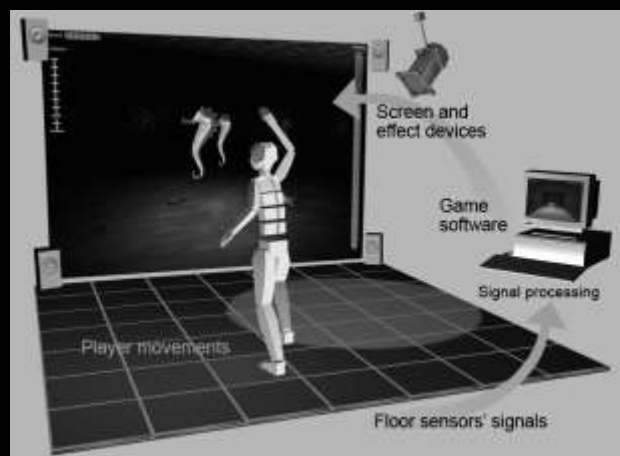
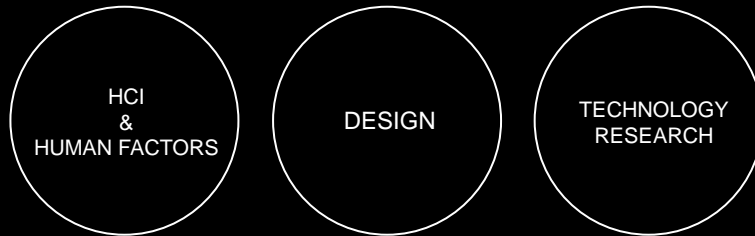
The 12th International Conference on Intelligent Environments - IE'16  
Creative Science Workshop  
12-16 September 2016, London, UK

**Tiina Kymäläinen**

VTT Technical Research Centre of Finland Ltd  
Human Factors in complex systems

**My Personal Narrative**

# Between the Disciplines



Lumetila: *Virtual Space - User Interfaces of the Future*, VTT, 1999-2001



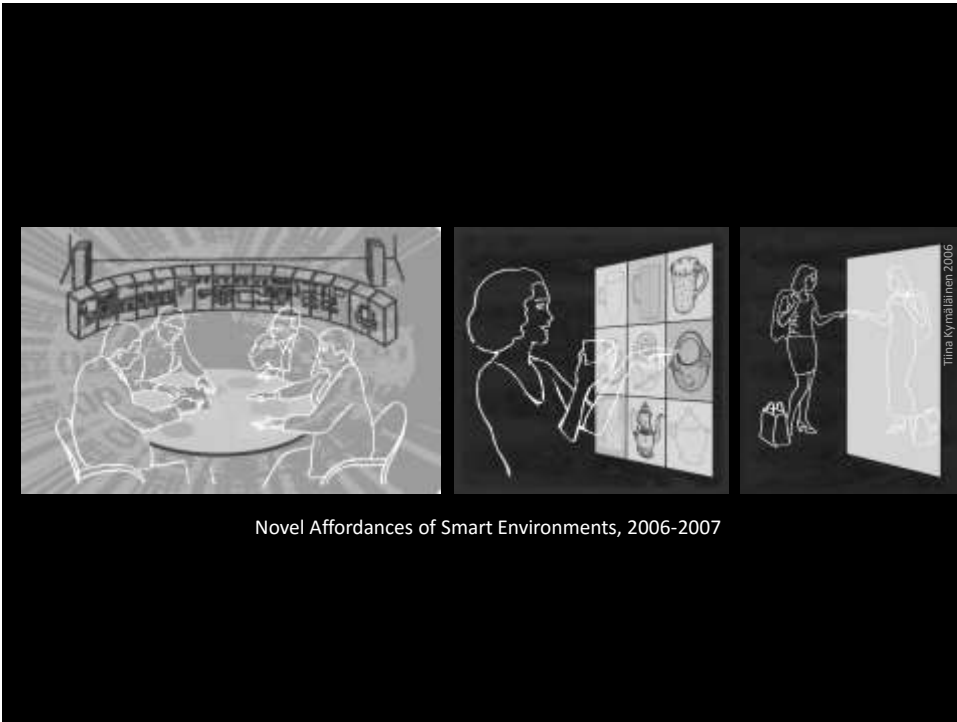
UbiPlay (PlayCreator): Creativity Tool for Interactive Playground, VTT 2003

Photo by SmartUs/Lappset, 2008

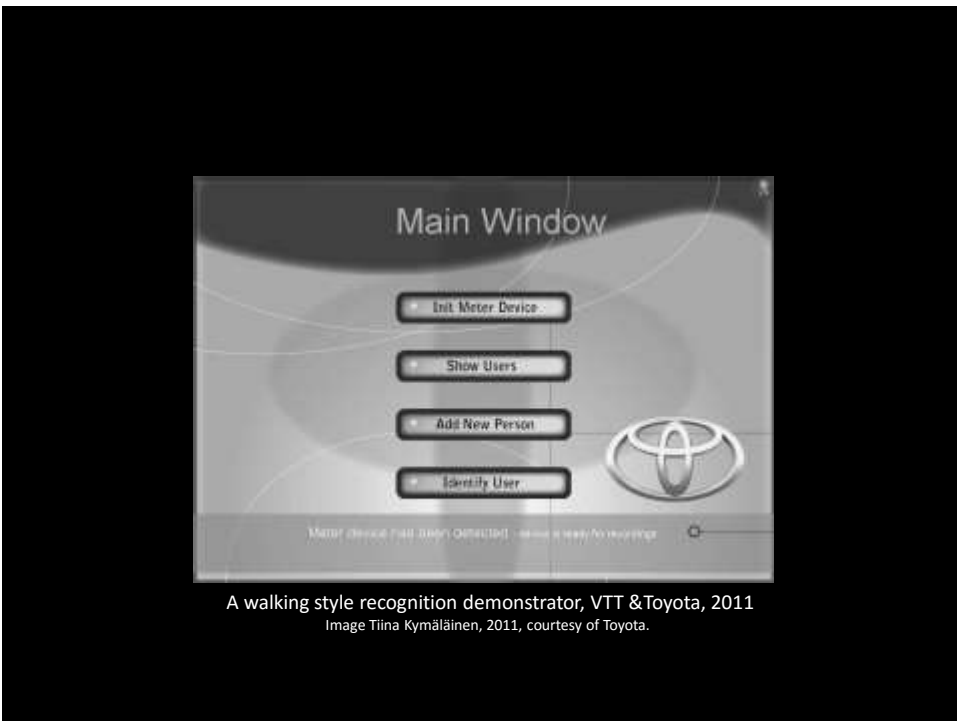


Tiina Kymäläinen 2004

Physical Browsing: Point Me, Touch Me, Scan Me –project (2004)



Novel Affordances of Smart Environments, 2006-2007



A walking style recognition demonstrator, VTT & Toyota, 2011  
Image Tiina Kymäläinen, 2011, courtesy of Toyota.

## Do-it-yourself Experiences for the Internet of Things

European research programme (ITEA2) DiYSE: Do-it-Yourself Smart Experiences, 2009-2012



1. Home Control System for an intelligent nursing ecology



2. Life Story Creation for seniors



3. AR Interior Design service  
Next Media programme of TIVIT supported by TEKES

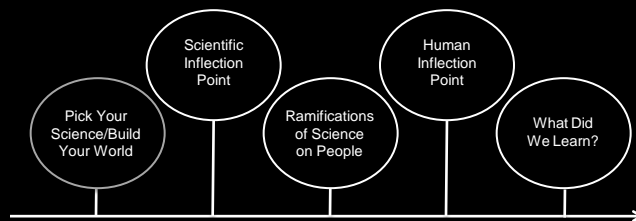


4. Music Creation Tool for the disabled

## CS & Science Fiction Prototyping

Creative Science Foundation:

A society that arranges forums, workshops and publication channels with the aim of finding means for any interested parties to collaborate, peer-review and publish their creative science work: <http://www.creative-science.org/>



B. D. Johnson (2011):

*"Use of science fiction as a means to explore, inform, and influence future scientific research and development"*

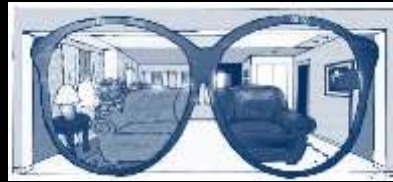
# My Science Fiction Prototypes



"Song of Iliad" 2011



"IF Alice arrives THEN Wonderhome incites" 2013



"Dreamnesting" 2013

## Science Fiction Prototypes as Design Outcome of Research Reflecting Ecological Research Approach and Experience Design for the Internet of Things Aalto University, School of Arts, Design and Architecture; Department of Design

### Design-oriented research



Case 1.  
Home Control System



Case 2.  
Life Story Creation



Case 3. AR Interior Design



Case 4. Music Creation Tool

### Research-oriented design



IF Alice Arrives THEN Wonderhome Incites



Dreamnesting



Song of Iliad

## Human Factors in Complex Systems



- Control room modernization
- Development of cab ergonomics in VR-laboratory
- Strong focus on human factors issues
- Future-oriented concept design



*Remote Operation Centre Future Concepts  
(various projects 2014-2016)*

## Latest Science Fiction Prototypes

Tiina Kymäläinen, Piia Perälä, Jaakko Hakulinen, Tomi Heimonen, Jobin James and Juha Perä

*Evaluating a future remote control environment with an experience-driven science fiction prototype*

11th International conference on Intelligent Environments  
Prague, Czech Republic, 07/2015

Tiina Kymäläinen, Eija Kaasinen, Maiju Aikala, Jaakko Hakulinen, Tomi Heimonen, Petri Mannonen and Hannu Paunonen et al.

*Evaluating future automation work in process plants with an experience-driven science fiction prototype*

12th International conference on Intelligent Environments  
London, UK, 9/2016

**Creative Prototyping as an Inter-Dimensional  
Portal Between Disciplines**



## Past, Present & Future of SFP

- How it has been applied:
  - technology and engineering research (specifically IE research)
  - foresight, futures- and business studies
- Similar practices in human-computer interaction:
  - critical design, speculative design and design fiction
- Common denominator:
  - scenario planning and scenario design
- Proposal for an inter-dimensional portal – for all the involved disciplines

## Co-evolutionary Spiral

One of the main themes in the paper is the co-evolutionary spiral between science fiction and different disciplines.

- “The science fiction stories told in movies and novels come to shape the course of real-world invention, and these in turn serve as a seed stock for ever more elaborate imaginings” (Johnson, 2011)
  - Miles (1993) (Futures studies)
  - Greenfield (2006) (Ubiquitous computing)
  - Bleecker (2009) (HCI/Design fiction)
  - Johnson (2009, 2011) (Intelligent Environment research)
  - Shedroff and Noessel (2012) (HCI/Design)
  - Dourish and Bell (2014) (Ubiquitous computing)
  - Tanenbaum (2014) (HCI/Design fiction)

## An Intermission

How science fiction literature genre  
is related to all this

## Proto-Science Fiction

John Clute, *Science Fiction: The Illustrated Encyclopedia* (1995):

- Pre-modern fantasy: More's *Utopia* (1516)
- Proto-Science Fiction: Bacon's *The New Atlantis* (1626)
- Johannes Kepler: *Somium seu Astronomia Lunari* (1634):

"Let us create vessels and sails adjusted to the heavenly ether and there will be plenty of people unafraid of the empty wastes. In the meantime, we shall prepare for the brave sky-travelers maps of the celestial bodies."



# Early Science Fiction

Thomas Disch:

- Edgar Allen Poe (1809 – 1849)
- Mary Shelley: *Frankenstein* (1818)  
(or the *Modern Prometheus*)
- Jules Verne:
  - *Around the World in Eighty Days* (1873)
  - *A Journey to the Center of the Earth* (1864)
  - *From the Earth to the Moon* (1865)
- H. G. Wells (1866-1946)



# H.G. Wells

Science fiction:

*The Time Machine* (1895)

*The Island of Dr. Moreau* (1896)

*The Invisible Man* (1897)

*The War of the Worlds* (1898), *When the Sleeper Awakes* (1899)

*The First Men in the Moon* (1901), *The Food of the Gods* (1904)

*The War in the Air* (1908), *The World Set Free* (1914)

*The Shape of Things to Come* (1933)



Philosophical and sociological books and essays:

*The Discovery of the Future* (1902), *Anticipations of the Reaction of Mechanical and Scientific Progress Upon Human Life and Thought*

(1902), *Mankind in the Making* (1903), *The Open Conspiracy*:

*Blueprints for a World Revolution* (1928), *World Brain* (1938), *The Fate of Homo Sapiens* (1939), and *Mind at the End of its Tether* (1945)

## The second decade of the twentieth century

- Hugo Gernsback coined the term “science fiction”; pulp magazine *Amazing Stories*, 1926
- *Metropolis* (1926)
- Karel Capek’s play *R.U.R.* (Rossum’s Universal Robots) (1924)



## Golden Age: 1930s and 1940s

- Isaac Asimov (1920 – 1992)
- Robert Heinlein (1907 – 1988)
- Olaf Stapledon (1886 – 1950)
- Aldous Huxley: *Brave New World* (1932)
- George Orwell: *1984* (1949)
- “Space operas”
- More:
  - Ben Bova: *The Science Fiction Hall of Fame* (1970)
  - Raymond Healy and J. Francis McComa: *Adventures in Time and Space* (1946)

## Co-evolutionary Spiral: Arthur C. Clarke's Speculative Communication Satellite



## Co-evolutionary Spiral: Clamshell Phone Design from Star Trek





## Science Fiction is a Cultural Network

- Science fiction fandom is a vast social network across the globe
- Numerous conventions are held every year celebrating authors, artists, new books and stories
- A “Science Fiction Museum and Hall of Fame” has been established in Seattle, Washington
- Science fiction is the most influential contemporary form of futurist thinking in popular culture – it is a culture unto itself

**Back to the topic...**

## **Creative Prototyping as an Inter-Dimensional Portal Between Disciplines**

### **Topics for the Science Fiction Prototypes**



Taxonomy of the SFPs:

T. Kymäläinen, Science Fiction Prototypes as a Method for Discussing Socio-Technical Issues within Emerging Technology Research and Foresight, *Athens Journal of Technology & Engineering (ATINER)*, 2016

## Futures Studies and Foresight

- Two special issues:
  - *Futures* (vol. 50, 2013)
  - *Technological Forecasting and Social Change* (vol. 84, 2014)
- Represent influential concepts:
  - *Black swan –events*
  - *Weak signals of change*

## Business studies

- Graham et al. explored the use of creative fictional prototyping for motivate and direct research into new high-tech products, environments and lifestyles
- Wu: “imagination workshops”
- Zheng and Callaghan: Diegetic Innovation Templating (DiT) process



## Co-evolutionary Spiral Between Future Studies/ Foresight and SFP

- Love (2001) Robot futures: “Science fiction and futures studies methodologies in action”.
- Bell et al. (2013) suggest the explicit use of science fiction prototypes for studying the evolutionary futures
- Foresight research project: privacy and intellectual properties surrounding organizations’ innovations (Stahl 2013)
- Detecting weak signals of change in the environment (Schwarz and Liebl 2013)
- Illustrate black swan events (Birtchnell and Urry 2013; Johnson, 2013)
- Illustrate complex societal problems (Clarke and Lear, 2010; Graham 2011)
- Social and ethical issues (McCullagh 2013; Nelder 2013)
- Unintended consequences and social practices from people’s engagements with technology (Birtchnell and Urry 2013)

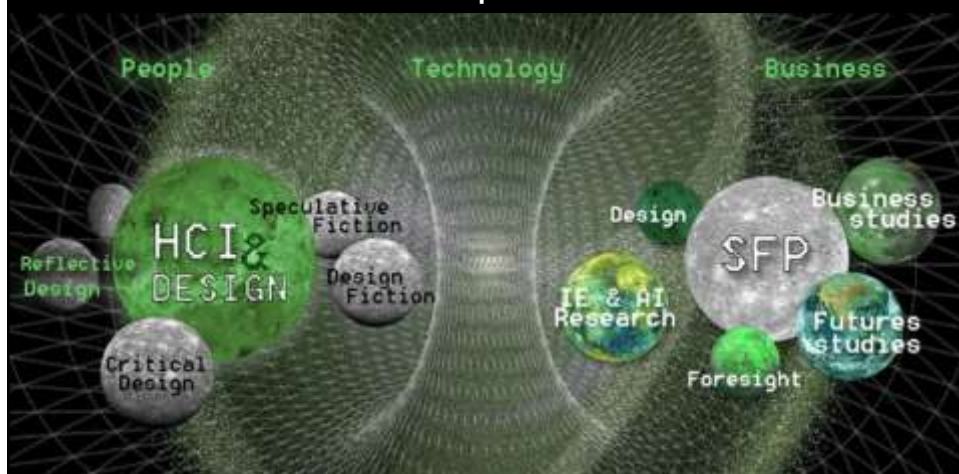
## Human-computer Interaction

- Reflective design
  - Critical design
  - Speculative design
  - Speculative visualization
  - Design fiction
  - Discursive design
  - Design probes
  - Value fiction
- Overlap between the practices; differences are more or less subtle
  - *All aim to remove the constraints from the normative design processes, increase the social awareness, use models and prototypes at the heart of the enquiry, use fiction to present alternative products, systems or worlds, and provide a system for analysing, critiquing and re-thinking contemporary technology*

# Design Fiction

- Dates its birth from 2005 when science fiction author Bruce Sterling coined the term
- Bleecker (2009) was the first to suggest using design fiction – i.e. speculative stories through objects – as a formal method or inquiry in design
- Lindley and Coulton: design fiction draws on speculative design, and its primary focus is on generating understanding and insights
- Fictional prototypes:
  - Lawson, et al.
  - Lindley and Coulton *Game of Drones*
  - Blythe, *Practical products for centenarian spies*
  - Kirman et al. *CHI and the future robot enslavement of humankind: a retrospective*

## Inter-Dimensional Portal Between Disciplines



HCI & design methods: Reflective design (Sengers et al. 2005), Critical design (Dunne and Raby 2001), Speculative design (Dunne and Raby 2013; Auger 2013), Design fiction (Bleeker 2009; Tanenbaum 2014; Lindley & Coulton (2015) etc.

## Why?

- Science fiction is always inter-disciplinary
- Allows multiple perspectives on the same issue to be explored and communicated
- By uniting the science fiction -related activities the outcome becomes more than the sum of their parts
- The inter-dimensional portal requires the use of judgment of all the different stakeholders with dissimilar background and knowledge bases
- The portal will enable space and time travelling

## How?

- We gather around important topics
- We use any/all creative science fiction –related method(s) for creating “scientifically credible” myths around the topics
- The outcome requires a balance between concreteness and openness: it needs to be specific enough to evoke intuitive reactions, yet indefinite enough to encourage imaginative extensions
  - Hope and fear are emotions pertaining to the future, in that both emotions have a future reference
- We utilize contemporary science and futurist thinking for providing stories that will arise important issues and enable space and time travelling

## Potential topics

- General topics in early science fiction:
  - Evolution of enlightenment, transcendence, and cosmic insight...
  - Disruptive technologies (?)
- Specific concepts in science fiction:
  - Asimov: *Foundation* (1951): **Psychohistory**: fictional science in universe which combines history, sociology, and mathematical statistics to make general predictions about the future behaviour of very large groups of people.

*“The universe is made of stories, not of atoms.”*

*Muriel Rukeyser*  
(American poet, 1913 –1980)

Thanks!



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